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WHERE LAND AND WATER MEET

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Prepared by the National Ocean Industries Association
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EXECUTIVE SUMMARY

The National Ocean Industries Association supports the national goals of coastal zone development and environmental protection called for in the Coastal Zone Management Act. Future development and continued economic growth of coastal areas depend in part upon protection of our environment. NOIA is firmly committed to environmental protection in the coastal activities outlined in this report. These activities represent an outstanding record of achievement in responding to human needs, especially when considering the magnitude of the task of developing our nation's outer continental shelf resources consistent with the national energy policy and sound environmental practices and safeguards.

The national interest depends on an efficient planning process, and effective coastal zone management should be closely related to a review of and decision on a project. NOIA seeks balance in such coastal decisions because equity is of paramount concern. Maintaining our nation's coastal areas for multiple uses is of top priority, and the value of coastal activities must be weighed according to necessary goals such as energy self-sufficiency, a healthy economy, and environmental protection. Our past experiences have proven that these goals not only are desirable, but are mutually compatible as well.

Now that the coastal zone management trumpet has sounded in coastal states, all coastal constituencies must recognize the unique and required roles of the others. Otherwise, the initially uncertain sounds promising "wise management of our coastal areas" for both development and protection will prove to be a cruel delusion for the American

people. It is time to stop debating the future of wise coastal zone management and begin working together to create it.

In implementing approved state CZM plans, NOIA believes state and local officials and concerned citizens should:

- view their state programs as a framework for decisions rather than blueprints detailing preconceived solutions for seemingly obvious coastal problems;
- encourage multiple-use of coastal resources as intended by the Act;
- determine that the threats to coastal areas are real and probable—not just a remote possibility—before banning any coastal activity;
- consider and document the national interest in coastal decisions while understanding the ramifications of those decisions; and
- administer local plans with the goal of providing better information concerning the range of coastal options available in order to find creative and equitable solutions.

NOIA also asks that the Federal coastal zone management effort, embodied in the Office of Coastal Zone Management, implement these recommendations to:

- establish criteria, responsibility, and accountability for states in making CZM decisions so that arbitrary actions are avoided and the intent of the law is fulfilled in practice;

  [NOIA believes it will be beneficial for all users if state coastal zone management plans have some elements of predictability, defined procedures, and a minimum of delay in decision-making. We urge OCZM to seek many views in assisting

the states in this endeavor.]

- continue yearly reviews to make sure the *dual intent* of the CZM law is being maintained in practice by the states;
- continue working with the Congress and user groups to establish guidelines for states in determining and implementing the "national interest" in their CZM decisions;
  [States need standards by which to judge the "national interest" in their local CZM-decisions.]
- streamline the permitting process;
  [The Office of Coastal Zone Management should assist states in developing an identifiable single—point permitting process for activities in coastal areas, and in establishing definite policies and procedures for obtaining permits for commercial activities in coastal areas.]
- guarantee continuous and effective public participation and information exchange in coastal resource areas of local and national concern.

For our part, the National Ocean Industries Association pledges to assist the Federal government, states, and citizens by urging member companies to:

- continue conducting their various activities to ensure the economic productivity of coastal resources while maintaining sound practices of environmental protection;
- assist in the distribution of technical and operational information needed by private citizens and public officials in making wise coastal zone management decisions; and
- be receptive to alternative proposals for coastal activities and uses when they are feasible.

NATIONAL OCEAN INDUSTRIES ASSOCIATION—WHO WE ARE

The National Ocean Industries Association (NOIA) is a non-profit, national trade association representing ocean-oriented industries engaged in the development and use of marine resources. NOIA membership is comprised of more than 400 companies involved in ocean related industries such as geophysical surveying, commercial fishing, offshore construction, air and marine transportation, offshore drilling, catering and housekeeping services, shipbuilding, financial services, marine salvage, research and technology, engineering and consulting, equipment manufacture and supply, offshore petroleum production, deepsea mining, gas transmission, and other activities. Most NOIA members are small independent companies involved primarily in ocean enterprises. One of the Association's basic purposes is to encourage optimum development and use of marine resources through the efforts of responsible commercial enterprises, consistent with sound environmental practices and safeguards.

NOIA, founded in 1972 by 35 people who became its first board of directors, provides a focus and voice for the smaller companies engaged in ocean resource development. Today, staff members work on a variety of projects to increase the public's understanding of the ocean industries and the vital role they are playing in the continued social, economic, and environmental well-being of our nation.

NOIA wishes to thank the Office of Coastal Zone Management for this opportunity to share its views with others interested in the wise management and proper use of our coastal areas, and hopes this publication will bring to readers a fuller and more balanced understanding of coastal issues.

"Where Land and Water Meet" was prepared by the NOIA staff and Association members, under the direction of the NOIA Environmental Protection Committee. It is one of a series of publications sponsored by the U.S. Department of Commerce through the Office of Coastal Zone Management (OCZM) of the National Oceanic and Atmospheric Administration (NOAA) as a means for varying points of view to be expressed concerning coastal resource management. The views presented are solely those of the National Ocean Industries Association and do not represent a statement of policy by the Office of Coastal Zone Management.

WHERE LAND AND WATER MEET

Several hundred years ago travelers approaching the Atlantic Coast of the United States reported smelling the forests long before coming within sight of land. Today the forests have given way to cities and industries providing those many things essential to our quality of life. In our past determination to "conquer the wilderness," and in our haste to "pave paradise and put up a parking lot," Americans have sometimes mistreated our land. It was taken for granted that the environment could absorb any impact, shrug off any indignity, survive any calamity—given time.

Most of these attitudes have changed, however, because continuing developments in technology and a new awareness on the part of all Americans have brought about a growing understanding that there are even greater needs for America's coastal resources than ever before. We also better understand that the ability of nature to accommodate a broad range of man's activities is remarkable, but not limitless.

Our concerns are presently so widespread that ordinary citizens employ terminology and ideas once considered to be the sole province of biologists and other scientists. A dozen or so years ago, for example, coastal marshlands were considered by many t be useless swamps which were good for nothing but breeding mosquitoes. The sooner they could be drained and filled the better. Today, we recognize those once despised swamps as priceless wildlife havens, as incubators for a wide variety of life forms in nature's food chain, and we refer to them as "nutrient factories" or "wetland resources."

Within reasonable limits thes changed attitudes are good. Most Americans today seem to recognize the balance needed in the many legitimate (and environmen tally safe) uses of coastal areas. However, a few people still are

conjuring up all the terrible things that could happen rather than recognizing all the positive benefits that are happening. They are lashing out at the nearest big target and shouting "STOP!"

Unfortunately, the nearest big target is often industry—big, highly visible, and not too fast on its feet. All industry, to some extremists, is lumped into a monolithic evil entity with one gigantic, soot-billowing smokestack where the bad people scheme to hurt the good people. So, the finger is pointed and the cries go up to get industry out, and keep it out.

This is overdrawing the picture a little, but it comes close to the way some people reacted when Congress passed the Coastal Zone Management Act in 1972. As far as these people were concerned, the Act was a tool that could be used, if not to get industry out of the coastal zone, at least to keep more of it from coming in.

The Act was useful in providing states and local communities with a valuable tool to focus attention on all coastal issues and users. But, when the Congress drew up the law, they had no intention of keeping industry out of coastal areas. On the contrary, the Congress specifically stated its belief in the need to "preserve, protect, develop and, where possible, to restore or enhance the resources of the coastal zone, and to encourage and assist the States in the wise use of the coastal zone for . . . economic development."[1]

The intent of the Act clearly is for balanced use of the coastal zone—for protection *and* development of coastal resources. The ocean industries join with the Congress in believing this is a good and realistic goal. We know, because it is one we are achieving.

If there was any doubt about the dual nature of the intent of the law, it was dispelled by later amendments[2] requiring that state CZM programs not only provide for adequate consideration of the national interest, but also set up a process to plan for energy facilities which might be located in the coastal zone or have a significant impact on it. For a state to close its coastal zone arbitrarily to offshore energy or food processing operations, for example, might be preferred by the local residents; but, considering the nation's hunger for energy and food, such an action would not be in the best interests of *all* the people, the national interest.

For our part, the National Ocean Industries Association is committed to helping commercial, recreational, wilderness, and public activities exist and flourish together in coastal areas. There are some who still insist this cannot be done, that the divisions between industry and other interests are too deep, or the conflicts too great. We disagree. We are pledged to the concept and practice of environmental safeguards. We are in coastal areas because we are water-dependent. This is where our future lies. And, we do not intend to do harm to coastal areas where we, along with others, make our homes and livelihoods.

Coastal zone management questions are complex and challenging, and the answers are often elusive. We have knowledge with respect to the coastal areas and our activities as a necessary part of the whole, but our report is not intended as a single-source reference book. We do not have a corner on truth, but we ask for a fair hearing in matters under dispute. To that end, we also hope that this booklet will help readers better evaluate the activities, beliefs, claims, and suggestions of others in regard to coastal management. Balance in understanding and judgment will have to come first if we expect to attain the balance in usage called for by the law and sought by each state coastal management program.

The members of the National Ocean Industries Association encourage all citizens to become aware of our maritime resources and the need for all forms of responsible coastal zone activity to coexist. We support the Coastal Zone Management Act, and believe that it offers an expanded potential for enlightened judgment, understanding, and cooperation among all those who live and work in coastal areas. With others, we share the anticipations and uncertainties of the future, but we are optimistic that fulfilling the provisions of the Act will help to fuse us together as permanent and effective coastal partners.

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THE COASTAL ZONE MANAGEMENT ACT IN A NUTSHELL

In 1972, recognizing that "the coastal zone is rich in a variety of natural, commercial, recreational, industrial, and aesthetic resources of immediate and potential value to the present and future value of the nation,"[3] the Congress passed the Coastal Zone Management Act. The objective of the original Act, and the 1976 Amendments, was to "establish a national policy and develop a national program for the management, beneficial use, protection, and development of the land and water resources of the Nation's coastal zones. . . ."[4]

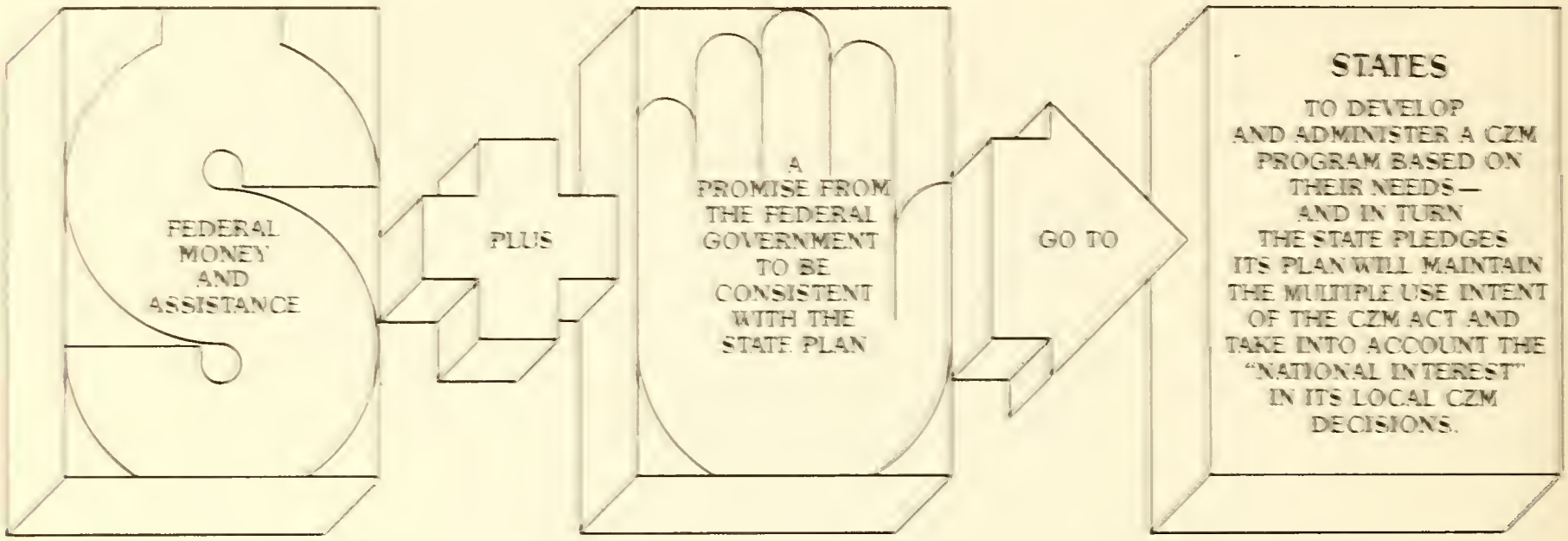
Since every coastal area has unique characteristics, needs, and priorities for coastal conservation and use, the law envisioned state leadership in planning and managing the various coastal area activities in their jurisdiction. Among the conditions built into the Act, was that a state's approved coastal zone management program recognize the dual intent of the law and, later, be administered to provide for both environmental protection and orderly use of coastal resources. In this way, a state has a wide degree of discretion within the perimeters of the Congressional intent.

The Office of Coastal Zone Management wants a state plan to meet the requirements of the Act by showing it has considered all coastal uses during the plan's development stage. After a state has developed and adopted a CZM plan, as many coastal states already have, it becomes eligible for implementation grants. During the implementation stage, OCZM monitors the state program to ensure that approved policies are maintained in practice. Thus, the Federal government's role is largely one of support, with the responsibility resting in state and local jurisdictions for planning and implementing the balance of coastal activities in their locales.

OCZM will not make coastal zone decisions for the state. The state and its citizens will assess their own needs and priorities and make decisions through an approved CZM plan. Financial and technical assistance is available to a state as it voluntarily continues to meet the general goals of the Act. The law was written in this way to allow states maximum local flexibility in meeting local needs. In return, the Act asks that states not arbitrarily exclude certain activities defined as important and in the national interest.

Basically there are three important relationships between the Federal government and state CZM programs which establish the partnership approach intended by the Congress: shared-funding, Federal consistency, and state consideration of the national interest. To encourage states in this management function, the Federal government provides up to 80 percent of the cost of developing state CZM programs. After program approval, the amount of Federal support increases but the states still provide at least a 20 percent share. The Federal government also promises its actions affecting the coastal zone will be "consistent" to the "maximum extent practicable" with the approved state program. In return, the Federal government seeks a *quid pro quo* from the state. The Federal government asks (as the CZM law requires) that states consider in good faith the "national interest" in their individual CZM decisions. In this way, the Federal government hopes to assure that all potential uses of the coast are fairly evaluated and that decisions are based on sound technical data after considering the views of all interested parties.

Thus a simple illustration might be:



The question then becomes, "What is a good faith consideration of the national interest?" This is especially important since the law recognizes many diverse coastal activities.

The national interest is an elusive concept which, naturally, means different things to state and local CZM officials in their specific coastal area. The law, however, requires it must be a factor in CZM decisions by saying: "The management program [must] provide for adequate consideration of the national interest involved in the siting of facilities necessary to meet requirements which are other than local in nature."[5] Thus, in this limited statement, CZM law gives almost no guidance as to what the national interest is, and the question remains open to interpretation.

NOIA believes the Congress should amend the CZM Act to give more specific guidance to the states for determining what is truly in the national interest. NOIA believes the burden of proof must rest with the state to justify its national interest reasoning in its CZM decisions. Guidelines and criteria should be developed so that industry can better know and plan. Also, alternative proposals should be required from a state which rejects a use proposal. In this way, states will become more aware of the difficult and important value judgments in CZM decisions. Until this is done the "national interest" will remain an enigma which everyone agrees must be considered in CZM decisions, but that no one can acceptably define when applied to specific CZM situations in local jurisdictions.

The Coastal Energy Impact Program (CEIP) is an important addition to the law. The CEIP was added by amendment to the Act in 1976 following the 1973–74 oil embargo when it became increasingly apparent that new ways were needed to encourage domestic energy production, especially from the Outer Continental Shelf, that would be in harmony with the objectives of emerging state coastal management programs. It was a critically important mechanism for helping state and local governments accommodate necessary (i.e. in the national interest) energy development in their coastal areas. Through CEIP, the Federal government assists state and local governments in dealing with the social, economic, and environmental impacts of new or expanded coastal energy activity. The Gulf states and Alaska currently receive the lion's share of CEIP funds because OCS development is concentrated in those areas. But, if the current drilling activities off New Jersey and Delaware or Rhode Island find significant amounts of oil and gas, then CEIP activities will assume a greater role in these areas as well.

After a state has an approved CZM program, Federal activities significantly "affecting any land or

water use in the coastal zone" are subject to the Federal consistency requirement of the Act.[6] This term is defined to include any Federal actions likely to cause significant changes or limitations in the manner in which land, water or other natural resources are used. The significance of the changes or limitations caused by the Federal action—such as approval of an OCS exploration and development plan—is to be considered in terms of the primary, secondary, and cumulative effects on coastal areas. Once this test has been met, the designated state agency for coastal zone matters is entitled to review the Federal action to assess its consistency with the provisions of its Federally approved state coastal zone management program.

Whether a proposed action requiring a Federal license or permit is consistent with a state's plan is a determination for the state to make. In most cases, informal discussions will ensure that the Federal activity proceeds in a manner consistent with the coastal program. Should questions still exist, a formal arbitration procedure may be invoked and ultimately the Secretary of Commerce may be asked to determine whether the proposal is consistent with the objectives of the Act; or, if not, if the activity is necessary in the interest of national security (always an overriding factor).

The Act is very ambitious. It calls for orderly development of finite coastal resources in many different political jurisdictions for many different activities. In effect, the Act brings state and local governments into a partnership with the Federal government and others to manage use of coastal resources. The objective of the Act is to see the coast and its resources become of maximum value to the people; but it does not impose those values, preferring to let the people determine them. Hopefully, citizen understanding and participation will ensure that our nation's coastal areas will continue to be as productive, attractive, and even more useful than they are now. Understandably, this is no easy task.

There has been some criticism that the CZM Act does not establish clearly identifiable program goals. However, this was not the purpose of the Act. Rather the CZM Act established a minimum threshold of state responsibility for developing a CZM process and putting it into place in each state. There are several points[7] which must be included by a state for its plan to receive Federal approval. The CZM Act says these points are basic for states which ultimately will be using the framework of their plan to make decisions affecting their coastal resources.

Still, one of the strong points of the state plans, like the Federal law, is that nothing is static. A state can always amend its program as a process of further "fine-tuning" key problems and issues. Likewise, court decisions and changes at the national level could change the overall direction of the program.

Thus, comprehensiveness is one of the hallmarks of the CZM program. As a program responsive to many legitimate needs, the program may sometimes seem elusive. To impose explicit objectives would be clear, but this would not be sensitive to many different coastal areas . . . and uses. Also, as one of the few comprehensive Federal programs, conflict resolution plays an important part in CZM decisions. It is much easier for other "single mission" programs to establish elements of predictability and a minimum threshold of performance. Most Federal programs are not geared to fluidity because their objective, and a single *modus operandi* to achieve it, is clear. The CZM mission, however, is to develop a comprehensive program aimed at general goals and multiple uses. This involves conflict resolution and a constant balancing in coastal areas with different resources and needs.

Of course, it might have been easier had the Congress simply vested all decision-making authority with the Federal government rather than allowing the people living in the areas to make these decisions themselves. Central planning is always administratively easier than a participatory "town meeting" approach. Instead, the Congress established the national goal of individual state coastal zone management programs and is making funds available through the Office of Coastal Zone Management for this purpose.

This national goal involves cooperation among multifarious government entities and coastal interests. It is a goal which has planned and built in numerous means for citizen participation. Therefore, it is incumbent on all those concerned with balanced coastal decisions to become aware of their state's coastal program and participate in making it work to benefit our nation's coastal areas.

PROGRESS UNDER THE COASTAL ZONE MANAGEMENT ACT AND BEYOND

At this point, making judgments concerning the progress under the Coastal Zone Management Act is difficult. The obvious question is: "How is such progress to be measured?" It naturally depends on one's orientation and priorities. The Coastal Zone Management Act does not attempt to eliminate the coastal priorities held by different entities, but hopes they might understand—and accommodate—other worthwhile and necessary uses of our nation's coastal areas.

Ultimately, of course, there are no simple solutions to coastal problems. Nearly all of us today who recognize the need for safeguards in coastal activities may be considered environmentalists. Also, most people recognize the seriousness of America's energy problems: how our energy supply is directly related to GNP, how the supply of petroleum products during the next 30–40 years will affect our lives, and our national need to increase our domestic energy supply. Language in the Act encourages these, and other, viewpoints.

As a concerned citizen, one might see significant progress to date since the CZM Act has increased awareness of *all* coastal concerns and the need for environmental safeguards *with* orderly, sustained development. But, the best measure of progress is the state CZM programs themselves. And, since these programs are just now being put in place, it is too early to make a conclusive assessment.

The CZM program is just a few years old. The Congress envisioned that the approved state programs would be in place by the end of Fiscal Year '79 (September 30, 1979). As of September 30, 1978, there were 13 state programs[8] approved by the Department of Commerce, which set up a process for making decisions affecting their coastal areas. It is estimated that nine more states[9] will submit and receive approval of their coastal zone management programs during Fiscal Year '79 and that the remainder will work toward approval despite diminishing planning assistance grants. There are 30 states and five territories eligible for voluntary involvement in the CZM program.

It should be emphasized that the plans themselves are not for any single purpose (i.e. to develop or preserve any single activity). The plans, to be approved by the Department of Commerce, must provide an implementation process by which people in each state will make important decisions regarding use of coastal resources. When a state submits its plans it tells what the program will accomplish, how it will make decisions, and the processes which will be used to ensure that the intent of the law will be fulfilled.

When a plan is accepted, a process is approved for making future decisions. A framework then exists in which coastal zone questions can be resolved by the state. Processes differ, just as coastal needs of a state are perceived differently. Issues are ranked by priorities. For instance, some state programs provide for a consultative process whereas the California Coastal Commission (the approved authority to administer California's CZM matters) must approve all permits for activities affecting their coastal zone.

After a state has an approved coastal zone management plan, the process of implementation begins and a state is eligible for Federal implementation monies for administration of the plan. Even then, the Office of Coastal Zone Management has ways to ensure that the intent of the law is met (i.e. all coastal users receive a fair hearing in the decision-making process).

Each year an approved state management program is in effect, the OCZM conducts what is known as "Section 312 reviews"[10] to determine whether the intent of the law is being followed. These Section 312 annual evaluations can lead to a decision by OCZM to cut

off funds because of mismanagement or impropriety, or to condition future grants, so the states must honor their approved plan.

How is a state's effort to be judged? What are the requirements for taking into account the "national interest?" Congress left wide open doors. It is difficult for OCZM to be any more precise on questions of this nature than the Congress was when it enacted the law. OCZM needs legislative guidance in making program determinations, and NOIA recommends that the Congress establish those guidelines.

To its credit, the Congress has consistently steered a mid-course in CZM legislation, but this has not included specific criteria. For instance, in the early seventies, the strong environmental mood was prevalent in our country, but in 1972, the Congress called in the CZM Act for both preservation and development of the nation's coastal areas. The passage of the 1976 amendments, following the 1973–74 Arab Oil Embargo, provided CEIP monies to assist local areas with energy facility siting and in preparing for the "onshore impacts of offshore development." This is a balanced proposal to respond to a critical need. Even in the face of the embargo, the Congress did not abandon established environmental safeguards. Therefore, the CZM program is still being tested with relation to implementation of its balanced mandate.

Most of the state plans submitted have been approved and the programs are into the real area of decision-making. The approved state plans are individual blueprints to resolve state-determined CZM issues. The plans in and of themselves do not necessarily create a state policy; rather, they often reflect existing state policies. State public and private organizations must work with the built-in mechanisms for participation to ensure that the plans have all the direction necessary for wise and balanced decision-making. NOIA urges OCZM to alert all coastal users and concerned citizens to the continuing opportunities for meaningful information sharing under the approved state plans. We also hope OCZM will continue to monitor the implementation of the state programs to ensure that balanced decisions are reached.

The mechanisms for approving or denying coastal activities under each state's CZM plan should be clarified. No plan should be approved without well-founded decisions by state authorities demonstrating that adequate weight to all views will be considered during implementation. For instance, a state authority should not be able to dismiss a national interest claim merely by saying it has been considered. Reasons and criteria must be known in order to prevent arbitrary and capricious decisions which do not take into account the national interest or the intent of the Act upon which the state programs were founded.

States should be held accountable for their decisions. In addition to standard criteria for the consistency and national interest provisions, adequate and public documentation of all decisions is needed. More predictability is also needed; and information at all stages in the process can ensure this.

MARINE SANCTUARIES

Another Office of Coastal Zone Management responsibility involves administration of the Marine and Estuaries Sanctuaries Program. Title lll of the Marine Protection, Research, and Sanctuaries Act of 1972 grants the Secretary of Commerce the authority, with Presidential approval, to designate Marine Sanctuaries in certain ocean waters for purposes of preserving and/or restoring the conservation, ecologic, recreational, or aesthetic values of sanctuary areas.

The Marine Sanctuaries program should not be viewed as a general purpose ocean management effort, however, but rather as an opportunity to preserve specific, unique marine resources much in the same way the Federal government has reserved land areas of extraordinary beauty as National Parks. Under the program, two Marine Sanctuaries have been designated: the Monitor Marine Sanctuary off Cape Hatteras, North Carolina, which protects the wreck of the famous Civil War ironclad ship the USS MONITOR; and the Key Largo Coral Reef Sanctuary, an extraordinarily beautiful coral reef off the Southern Florida Coast.

In 1977, President Carter directed the Secretary of Commerce to identify sites of potential sanctuaries. Of the 170-plus sanctuary nominations, the Office of Coastal Zone Management now is studying four proposals; three off California, and one off the Gulf Coast.

The sanctuary designation process begins with consideration of a formal sanctuary nomination. The nomination describes the proposed sanctuary's boundaries and the resources subject to protection, and suggests a management program to preserve the essential attributes of the sanctuary. The management program varies from sanctuary to sanctuary according to the resources preserved by the sanctuary. Initially some people misconstrued the program as cordoning off large ocean areas from many acceptable, and wholly appropriate, uses such as energy development. Fortunately, OCZM has repeatedly gone on record as supporting multiple uses of sanctuary areas and has adopted policies calling for only the minimum amount of management regulations necessary to protect sanctuary resources. Designating an area a Marine Sanctuary does not preclude economic activities from occurring within the sanctuary. Indeed, issue papers for the California Sanctuaries suggest that OCS oil and gas development can occur within a sanctuary area while still preserving the resources the sanctuary is designed to protect.

Many groups, like the National Ocean Industries Association, support the intent of rational preservation of marine resources. However, the Marine Sanctuaries program, as worthwhile as we believe it can be, seems to be in conflict with the President's Executive Order 11593 calling for reduced government regulations. We support President Carter in his call for eliminating regulations which are overlapping with other existing Federal regulations. We support the Marine Sanctuaries program when there is a need for it.

There is a clear need for some sanctuaries, but some groups have suggested the need for the Marine and Estuaries Sanctuaries Program Office may be duplicative of other Federal efforts.

The first step in reviewing a nomination involves examining a proposal's feasibility. To do this,

OCZM produces a sanctuary issue paper, laying out the sanctuary nomination and suggesting management policy options. Following comments and workshops on the issue paper, OCZM may advance the sanctuary's candidacy by producing a Draft Environmental Statement (DES) on the sanctuary. At this stage, OCZM holds formal hearings in the affected coastal area. After considering comments on the DES, OCZM will publish a Final Environmental Statement (FES). The final step is formal designation of the sanctuary by the Secretary of Commerce upon approval of the President.

Marine Sanctuaries which extend into State waters must also receive approval from the affected states. In practice, OCZM works very closely with states bordering on a proposed sanctuary whether the sanctuary actually covers waters within the state's jurisdiction or not.

During the spring of 1979 OCZM is considering designating four sanctuaries off the California and Gulf coasts. Off California, OCZM has prepared a combined issue paper examining sanctuary proposals for the Point Reyes-Farrallon Island area, Monterey Bay, and northern Santa Barbara Channel. OCZM is also studying a proposed sanctuary in the Flower Garden Banks off the Texas and Louisiana coasts.

A strong case can be made for sanctuaries of reasonable and manageable dimensions, which are established to protect or preserve a unique and valuable marine resource. After an initial shaky start, NOIA believes the Federal Marine Sanctuaries Program Office will implement sanctuaries on a site-specific basis, with proper recognition of compatible multiple use principles. NOIA seeks to assist in that process be it under the Sanctuaries office, CZM office or, preferably, under previously existing Federal authority.

Still, NOIA sometimes wonders whether any substantive or procedural process can adequately determine the "aesthetic" values of sanctuaries. We question how this can be done, and whether the Federal government should attempt to determine aesthetic values for people. By the same token we also question the prudence of many things the government attempts to do!

In view of the above observations it would appear that certain steps could be taken to put the Marine Sanctuary program on a firmer footing and introduce essential elements of realism and increased public awareness. NOIA offers the following suggestions toward this end:

1. a schedule of the proposed sanctuary program for the next 4–5 years, similar to the Department of the Interior's Proposed OCS Lease Sale Planning Schedule, should be made available to the public;
2. maps of the proposed sanctuaries should be made public at an early date;
3. definitive standards should be established for sanctuary proposals in order for them to qualify for consideration by the Department;
4. sanctuary proposals which conflict with resource development should be subjected to a careful cost-benefit analysis;
5. the minimum of additional regulations, over and above those already existent, should be imposed in designated sanctuaries;
6. the principle of multiple use should be applied to the maximum extent possible; and
7. large committments of the public domain to sanctuary status should be subject to Congressional approval, as is the case with wilderness area designations onshore.

BY THE BEAUTIFUL SEA

We live on a watery planet. The oceans, containing some 330 million cubic miles of water, cover almost three-quarters of the earth's surface. If the crust of the earth were to be leveled, with all the great mountain ranges and abyssal depths evened out, the planet would be covered by a uniform sheet of water more than 10,000 feet deep. Impressive, yes—yet all the water on earth, both fresh and salt, make up only a little more than one tenth of one percent of the volume of the planet Earth. It becomes apparent, then, that water, like beauty, is only skin-deep—and again like beauty, is a rare and precious gift. Water is, perhaps, the most precious of all the earth's resources.

The members of the National Ocean Industries Association appreciate this since they earn their living from the development and production of the ocean's living and non-living resources.

Scientists say life as we know it would not be possible without the sea. And the quality of life as we now enjoy it surely would not be possible without the use of the rich resources contained in and under the sea.

It is for this reason that we in NOIA do not share the notion of absolute conflict between the industry and the environment. We believe people, nature, and technology can live in harmony, and, in many respects, already live in a balanced, productive, continuing relationship.

People have been harvesting the ocean's resources for hundreds of years. The first scientific oceanographic expedition was made by the HMS CHALLENGER in 1872. It is significant to note that some scientists are still using and studying data taken by the HMS CHALLENGER today. This expedition marked the first step by scientists and engineers into the sea. The succeeding steps have been most impressive.

Ocean use technologies have been developing at a rapid pace. The costs are virtually incalculable.

Much of this technological development has been in an area that allows industry to develop the ocean's resources in a manner not damaging to the environment.

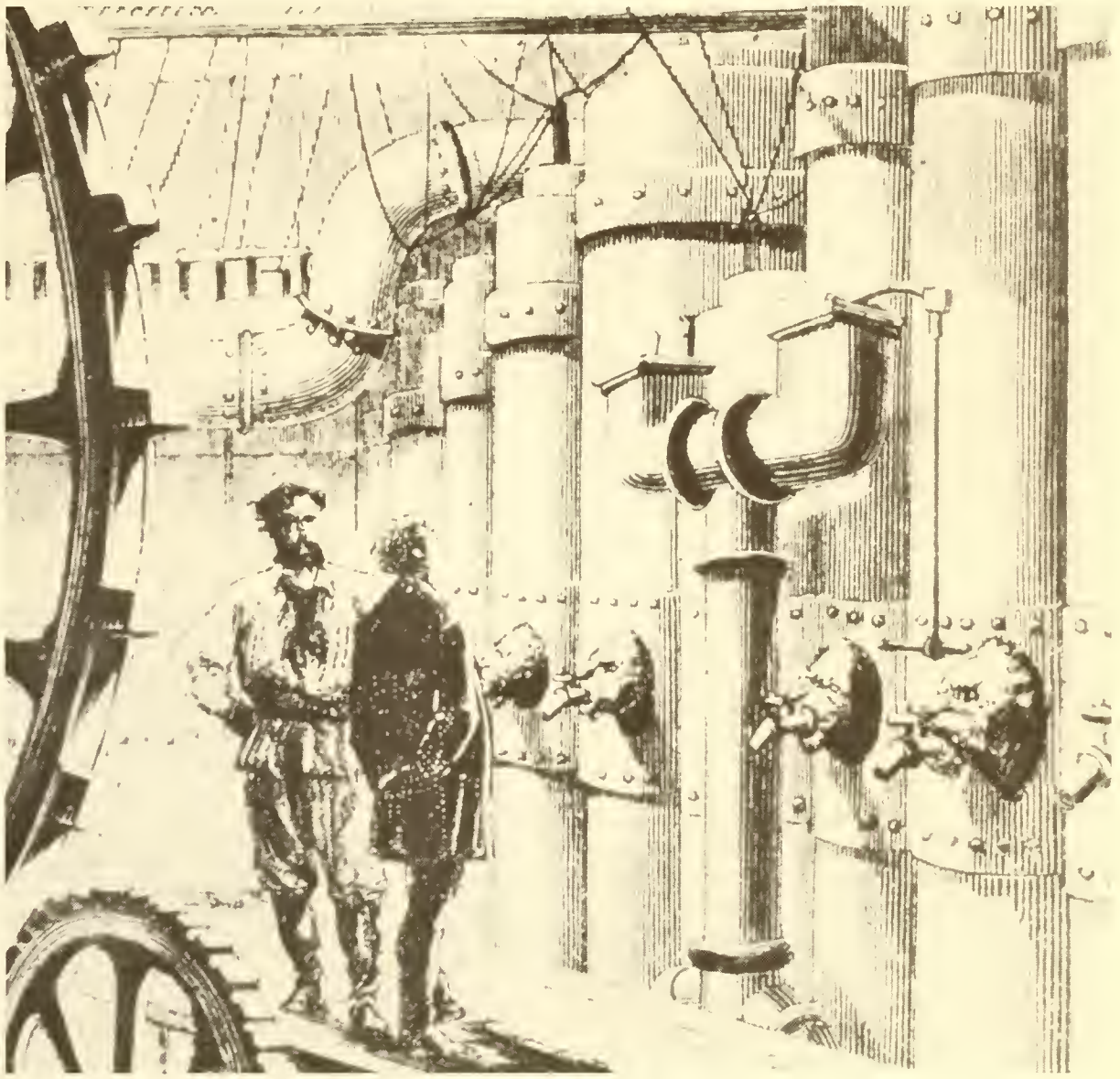
While some believe that no activity in the ocean is desirable and others favor no regulations and unrestricted activities, again we believe that people, nature, and technology can, through wise planning, live in harmony.

Coastal zone management offers coastal states and affected counties a mechanism to plan and have an input into activities affecting coastal areas. One approach to CZM is the implementation of a defined regulatory and permitting process. This is one of the objectives of the Coastal Zone Management Act. With such a clear process, industries can accurately plan their activities to ensure the adequate development of ocean resources without encountering unnecessary production delays and causing an adverse economic impact on consumers. Inefficient government does not benefit anyone—the consumer, the environment, the ocean industries, or the nation.

TO HIP-BOOT DEPTH AND BEYOND

The beginning of man's relationship with the sea probably occurred when a primitive man, following the example of a gull, pried open a clam, ate the contents, found it satisfying, and looked around to see what else the water had to offer. Later, he learned to spear fish, gouge a tree trunk into a canoe, build a raft, and weave a net. These were the first ocean industries. In time, they led to small but sturdy fishing smacks, and much later to ships of exploration that bridged the dividing seas, and the lumbering merchant-men of commerce. Thus, the fishing and shipping industries of today grew from roots buried deep in antiquity.

In addition to working on the surface of the sea to harvest its depths and move goods across it, early men somewhere lost enough of their fear of the great unknown to enter into it. They learned how to hold their breath for minutes at a time as they plucked sponges and shellfish from the ocean floor. Long after them came such things as submarines, the bathysphere that Dr. William Beebe rode to a 3,028-foot depth in 1934, TRIESTE I, which sounded the deeps at 35,800 feet in 1960, and underwater living experiments like Sealab and Conshelf. But these endeavors were for military or scientific rather than commercial applications. Modern examples of men *working* in the sea generally were limited to fishing until the advent of the offshore oil industry. Today NOIA



members are working in the seas and their activities are beneficial to everyone: taxpayers, consumers, employees, government, and the general economy. These are important factors in determining the national interest.

The first useful oil production in the coastal area of North America was the natural seep off the Pacific coast near what is now Santa Barbara, California. Records of the early explorers indicate that Indians living nearby collected tar from the beach, using it to caulk their canoes to make them watertight.[11] This natural oil seep, identified on maps as Coal Oil Point, continues to deposit tar on the beaches of Santa Barbara today[12] and in other offshore areas.[13]

The first real Gulf Coast offshore activity took place in 1938, when Pure Oil Company erected a wooden platform in 15 feet of water to develop and produce oil reserves from Louisiana's Creole Field. Less than 10 years later, in 1947, the Kerr-McGee Corporation established commercial production on the world's first steel platform, in 20 feet of water some 45 miles south of Morgan City—"out of sight of land" for the first time. The offshore oil and gas industry was on its way.

From these historic firsts, the post-war technological boom has brought the United States' offshore oil industry into progressively deeper waters, not only in the Gulf of Mexico but in the Pacific off California and Alaska, and, now, in the Atlantic off New Jersey and Rhode Island.

The energy crisis is the most serious challenge our nation has had to face in recent decades. Energy consumption throughout the world has escalated dramatically during the prosperous post-war economic era. Despite the energy squeeze following the 1973 oil embargo, there is no reason to believe this trend will reverse itself.

The indisputable fact is that our nation spent $45 billion in 1977 for the imported petroleum we needed. But government delays hampered the industry from exploring as much as possible domestically for additional supplies.

In addition to a tremendous contribution of technological expertise and capital investment, NOIA members have always been cognizant of their responsibility with respect to conducting environmentally sound operations in the ocean.

Today all ocean companies must prepare project assessments to analyze each new activity for any adverse impact that could possibly occur from the implementation of their plans. Often these assessments are several volumes long.

Studies of one type or another have been conducted for offshore activities from 1952 to the present. While there are surely studies suggesting damage, most have found no evidence of any significant long-term adverse environmental impact.[14]

The need for ocean energy development is well known. But there are needs to conduct a wide variety of other important ocean activities too. We must also constantly develop new ways to do things better, faster, cheaper or safer by industry/government/academic research and cooperation.

Because offshore and related work opportunities are so diverse they are often not understood. "What do the ocean industries do anyway?" is an important first question before their economic and environmental impact can be assessed.

The ocean industries consist of many parts operating together to achieve individual and joint success. The best way to describe the process is to relate it in the following narrative of how the process unfolds and works.

THE OFFSHORE INDUSTRIES AND HOW THEY GREW

ENERGY

The sea has always been a source of mystery and romance. The oceans once were thought to be the domain of creatures and gods who would swallow up anyone daring to venture beyond sight of land. Even after the first European exploration ships set out in the 15th century to search for new lands treasures, the seas were regarded more with awe than understanding.

Today, oceans continue to hold mystery and challenge. In no activity is this more evident than in oil and gas production—the modern form of exploration for treasures on (or beneath) the seas. Today research revealing the uniqueness and complexity of the ocean environment has led to the discovery of new resources and technologies for meeting mankind's shortage of energy.

The ocean floor and the geological structures beneath it have already become the most challenging and productive areas for oil and natural gas exploration. Today offshore the United States more than 23,000 exploration and development wells have been drilled but not all of these have produced, of course. About one-third were "dry holes." As the United States faces a scarcity of domestically produced oil and gas, the resources located beneath the ocean floors promise to play an increasingly important role in meeting our national energy requirements.

Most of the United States' onshore areas likely to contain oil and gas deposits have already been explored. Most of the remaining undiscovered onshore oil deposits are apt to lie in geological structures and fault traps, which are costly to evaluate and whose size often may not justify the capital investment necessary to bring them into production. We also know that conversion to an alternative energy source (such as wood to coal and coal to oil) has historically taken 40–50 years and that, during this interim, oil and gas will continue to be our principal source of energy. Today we are supplying nearly 50 percent of our petroleum needs from abroad and this places America in a tenuous political and economic position. Americans prefer independence, and the ocean industries are working to see that America is not so likely to be caught over someone else's barrel as it was during the 1973–74 oil embargo.

Fortunately, the Outer Continental Shelves hold great potential. Only four percent of the United States' offshore areas have been leased for petroleum exploration. Yet offshore resources already account for 15 percent of the total domestic oil production and 23 percent of domestic natural gas production.[15]

Many people attribute America's successful offshore effort to the major petroleum companies, but this is far from the case. Today more than 170 independent companies are involved in oil and gas operations in the Gulf of Mexico, and this does not take into account the host of offshore service, support, or supply companies (who make up the bulk of NOIA membership) or inland companies supplying needed parts, services, and related support activities to offshore operations.

Basically the large oil companies have the investment capital to take the risks offshore. They contract out for most exploratory services they need to produce offshore oil and gas. NOIA members compete with one another to provide their service to an oil company. An oil company must gather all the diverse services needed to develop an offshore area successfully. The oil companies hire independent geophysical, drilling, and diving contractors from an available, willing, and talented selection of U.S. companies. The geophysical and drilling contractors, in turn, go to shipbuilding firms to build their boats or "rigs." The construction companies use steel and parts from other suppliers and so the multiplier effect goes.

Offshore oil and gas exploration is risky. Return on investment of more than $22 billion to date has been about seven percent. Net income as a percentage of net worth is average for all American industry.[16] There are no guarantees and, with the costs so great, only the oil companies can pay everyone needed to mount an offshore effort be it successful or not. For instance, in the Destin Anticline off Florida, oil companies paid more than $1.5 billion to the Federal government for the right to look for oil and gas on selected leases. The companies then spent $19 million on drilling eight exploration wells. All were dry holes or "dusters". The project was abandoned. The process of taking these gambles is as complex as it is costly. Enough professional skills and academic disciplines to staff a university are involved: lawyers, economists, businessmen, oceanographers, geologists, geophysicists, engineers, and computer experts.

The interested companies bid competitively for the right to look for oil and gas from the Federal government because offshore lands (outside State waters) are

federally owned. The Federal government has divided the Outer Continental Shelf into "blocks" of not more than 5,760 acres. Companies gain the right to drill for oil and gas (the only way to determine what—if anything—is "down there") in these blocks through a process of leasing.[17] A given block or group of blocks is first nominated for lease consideration by prospective leasees. Citizens are afforded the opportunity to nominate blocks they wish to see withheld. When the government decides to hold a lease sale, bids are readied by the companies. Theoretically, anyone can bid; but, in practice, mostly the oil companies do. No one would want to bid unless they had the money and willingness to explore the blocks or the ability to absorb a total financial loss if their bid was accepted by the government. Other businesses or people with a lot of money could bid, but then, why would they want to bid alone? Some large companies which are energy users may become part of a bidding group. It's risky enough for companies with years of experience. No one in the offshore business has ever known a sure thing.

Before any bids are submitted, however, complex and lengthy studies and public hearings are conducted to determine the environmental effects of proposed exploration and production. All this, before any activity has taken place even though the chance for a commercial offshore find is one in ten.

After environmental impact assessments have been concluded—which may take more than a year—the government formally announces that a sale will be held for leases on specific blocks. Company bids are secret and different types of elaborate procedures and safeguards have been developed to protect confidentiality until the bids are opened in public by a representative of the Bureau of Land Management of the U.S. Department of the Interior. The amount of a bid is determined by the oil company's estimation of four things: its view of the likelihood of finding oil and gas, the possible extent of the deposit, the potential economic return of development, and the likely costs of hiring the various independent contractors to do the work. Even a high bidder on a given block may be refused a lease if the United States Geological Survey (USGS) assessed the block at a higher potential value than the bidder did. Of course, all values are speculative until the drill bit actually penetrates a possible oil or gas deposit.

The highest winning bid on record for a single 5,760 acre block in the Gulf of Mexico was $212 million. That gave the oil company the right to explore for and produce oil and gas found under the lease, and was in addition to rent and any royalty payments plus costs to independent contractors accrued in the actual process of exploratory drilling. That particular block was on the Destin Anticline mentioned above and was as dry as could be.

Successful bidders must submit an exploration plan to the Department of the Interior detailing how drilling is to proceed and what precautions will be taken to ensure compatibility with the ocean environment. The successful bidder may be denied a permit to drill if his exploration plan does not take into consideration stringent environmental safeguards. Also a lease can be automatically revoked for any violation of the plan.

Before obtaining a permit to drill, the company must submit a detailed plan for the activity to the USGS Supervisor. The plan must include a description of all onshore and offshore facilities with details on labor, land, materials, and energy to be used. The company is usually required to furnish ocean bottom surveys identifying potential accumulation of sea life and objects of historical or archaeological significance. Copies of this information are sent by the Supervisor to the Governors of directly affected states as required by the CZM Act and the Outer Continental Shelf Lands Act.

Pollution control and cleanup equipment must be available to the company before a permit to drill is issued. The company is required to submit an oil spill contingency plan to the Supervisor to minimize property damage in the event of a spill. Personnel must be trained in all phases of equipment maintenance and operation for prevention of pollution.

When the permit is finally obtained, the company must meet additional rigid USGS specifications for materials with adequate safety factors and must use the safest drilling procedures. Drilling crews must also receive special training for offshore operations. Periodic surprise blowout prevention drills are held to ensure that all equipment is operational and crews react correctly in emergencies.

There are also USGS orders covering platforms and structures. The regulations require certification of the platform by a registered professional engineer. All production facilities such as separators, treaters, compressors, and flowlines must be designed, installed, and maintained "in a manner which will facilitate efficient, safe, and pollution-free operation."[18] Fire prevention, fire fighting, and gas detection equipment are specified. Innumerable pressure sensors, relief valves, and fail safe devices to shut in the wells in case of equipment failure are required. Also "the company shall make a planned, continuing effort to eliminate accidents due to human error. This effort shall include the training of personnel in operational aspects of their function and a program to instill in each individual working offshore a conscious desire to achieve safe and pollution free operation."[19]

A company which fails to comply with these regulations is subject to heavy penalties: its production may be shut off, eliminating income, large fines may be assessed, or its lease may be cancelled.

The U.S. Coast Guard has additional rules and regulations relating to safety of life and property, including specifications for lighting and warning signals on offshore structures. The U.S. Army Corps of Engineers considers navigational safety when issuing permits for the location of offshore platforms and structures. The Office of Pipeline Safety in the U.S. Department of Transportation issues standards for the lines. The Department of Labor establishes OSHA standards for offshore operators, and unannounced USGS or Coast Guard inspectors are frequent visitors to offshore platforms to make sure all is going according to the regulations, orders, and permits.

As you read about proposed regulations and the continuing conflicts between the ocean industries and special interest groups, you may conclude that industry opposes all regulations. This is not the case. Members of the National Ocean Industries Association realize that fair, impartially enforced regulations are useful in our competitive enterprise system. But regulations are rightfully opposed by the ocean industries when they serve no purpose—and only serve to satisfy those who oppose progress, thereby creating unnecessary delays and excessive costs. Every citizen eventually pays for the delays and extra costs.

Honest differences of opinion do occur. Then the ocean industries ask only that the final decisions be left to those who are impartial, those who are looking only after the national interest, and those who will consider the ocean industries' excellent record.

Numerous studies have shown the adequacy of offshore regulations implemented by the responsible industries involved. In oil and gas exploration, for example, these studies indicate that surrounding water quality has not been degraded and there has been no permanent damage to the environment. A Library of Congress study stated that oil and other hazardous materials have been spilled from tankers, barges, industrial runoff, and other sources many more times and with a more damaging aggregate impact than from drilling and producing wells.[20] In fact, quoting from USGS Circular 741 (1976), "no spill in excess of 50 barrels has been recorded during exploratory drilling either on the Federal OCS or, to our knowledge, in any offshore area throughout the world."[21] And, spills from producing operations have, since 1970, averaged only two one thousandths of one percent of produced volume—a truly remarkable record!

The Federal government's successful management of OCS oil and gas production is proved by analysis of USGS statistics. During a 23 year period, from 1953 to 1976, the value of OCS petroleum production was about $27.6 billion, while the petroleum industry paid $22.9 billion into the Federal Treasury in the form of bonuses, rents, and royalties. In other words, the Federal government derived 83 percent of the total value of the revenue from these resources and the companies received 17 percent out of which they had to pay all exploration, development, and production costs. As an over-all industry effort, these companies have not yet received sufficient return to justify their tremendous financial risks. Those individual companies which may have made a profit further shared it with the government by paying income taxes. And the people who received money from the companies (employees and stockholders) also paid taxes on these earnings.

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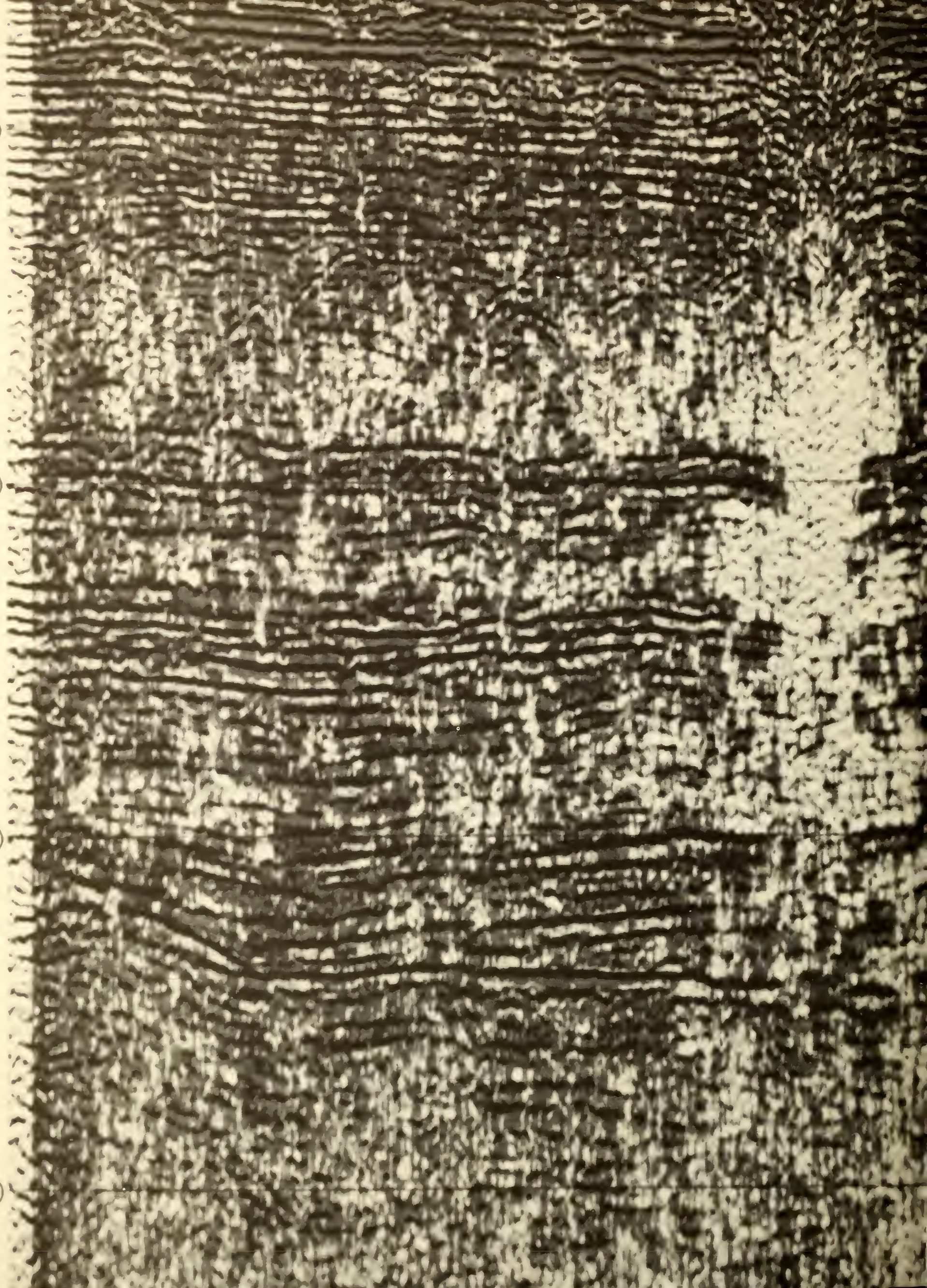


GEOPHYSICAL SURVEYING

Both before and after the permits have been issued, independent geophysical contractors are hired by interested parties to assess the prospects for oil and gas. Contractors' selection is based on a combination of factors—past accuracy, cost, and availability. The geophysical companies sometimes "shoot" certain areas as an independent venture and then sell the information to interested parties. In geophysical work, confidentiality is paramount because the proprietary information they gather, sell, and interpret is the "product" of the geophysical companies. Their reputation as to how well they gather and interpret information determines whether they stay in business.

If there were a book of a thousand pages documenting the 4.5 billion years of the earth's history, each page would cover 4,500,000 years. Our first identifiable ancestors would appear about three pages from the end of the book. Homo Sapiens would appear at the bottom of the last page, and everything that had happened in recorded history would somehow have to be telescoped into the book's final few words.

The geophysical survey companies of the NOIA membership turn back the pages of history to

a time millions of years ago when hydrocarbons began to form and, more important, to where they formed. Through technology, study, and experience, they are able to locate general areas where there are indications that possibly oil and gas *might* be present. Again, nothing is certain.

Geophysical contractors gather and analyze data or the leasees employ their own fulltime geologists or geophysicists for interpretations. Extensive tests are made to determine—as accurately as possible—the geological configuration of the layers beneath the ocean floor. Seismic tests determine the presence of formations likely to contain oil and gas by measuring the length of time required for sound to travel to the surface. This requires very sophisticated equipment. Literally thousands of miles of seismic data may be taken and analyzed before drilling begins. For instance, more than 30,000 miles of data was collected before any drilling began in the Baltimore Canyon area of the East Coast. Other tests conducted during the predrilling phase usually include magnetic and gravity surveys.

For offshore areas all the information is gathered from seismic survey boats. Formerly, explosives were used to generate the energy to reflect off the strata below but, for more than 10 years, a non-dynamite energy source has been towed behind the boats which emits harmless periodic "pings." The data collected is then sent onshore for analysis. Geophysical work causes no damage in coastal areas. Crews arrive (and leave) before the drilling and support activities begin in an area. With the elimination of the use of explosives (one of many industry developments), geophysical work has no impact except from the use of government inspected boats on the water.

DRILLING

When the lease operator decides where the best prospect is to drill an exploratory well, an independent drilling contractor is called in. This is a company that "rents" drilling rigs to oil companies during exploration and development. Like geophysical contractors, drilling contractors are competing against each other worldwide for business. Again, the operator looks for price advantages, reliability, availability, and competence from a contractor. Different drilling contracting companies often specialize in different types of rigs for the unique characteristics of a specified job and the environmental conditions. Exploratory drilling is generally done from mobile rigs which may be self-propelled or towed to the drilling site.

The advances in the capabilities of drilling contractors are mind-boggling. The first offshore well was drilled from a rig mounted in about 15 feet of water. Today, drilling rigs and their specially trained crews are capable of operating in water depths of more than 3,000 feet. Besides drilling in deep water there is equipment now in use that allows production from these depths.

Three types of mobile rigs are generally used in offshore exploration today. Jackup rigs, with legs extending to the ocean floor and "jacking up" the drill platform deck, are usually used in water depths of less than 300 feet. Drill ships are, as the name implies, ships specially outfitted with drilling equipment. They vary from 200 to 500 feet in length and are capable of drilling in areas where water depths are more than 3,000 feet. Semi-submersible rigs are generally used where seas are rough and their open hull design allow water and wind to move through the structure and have little effect on drilling operations. They are partially submerged to provide stability during the drilling process.

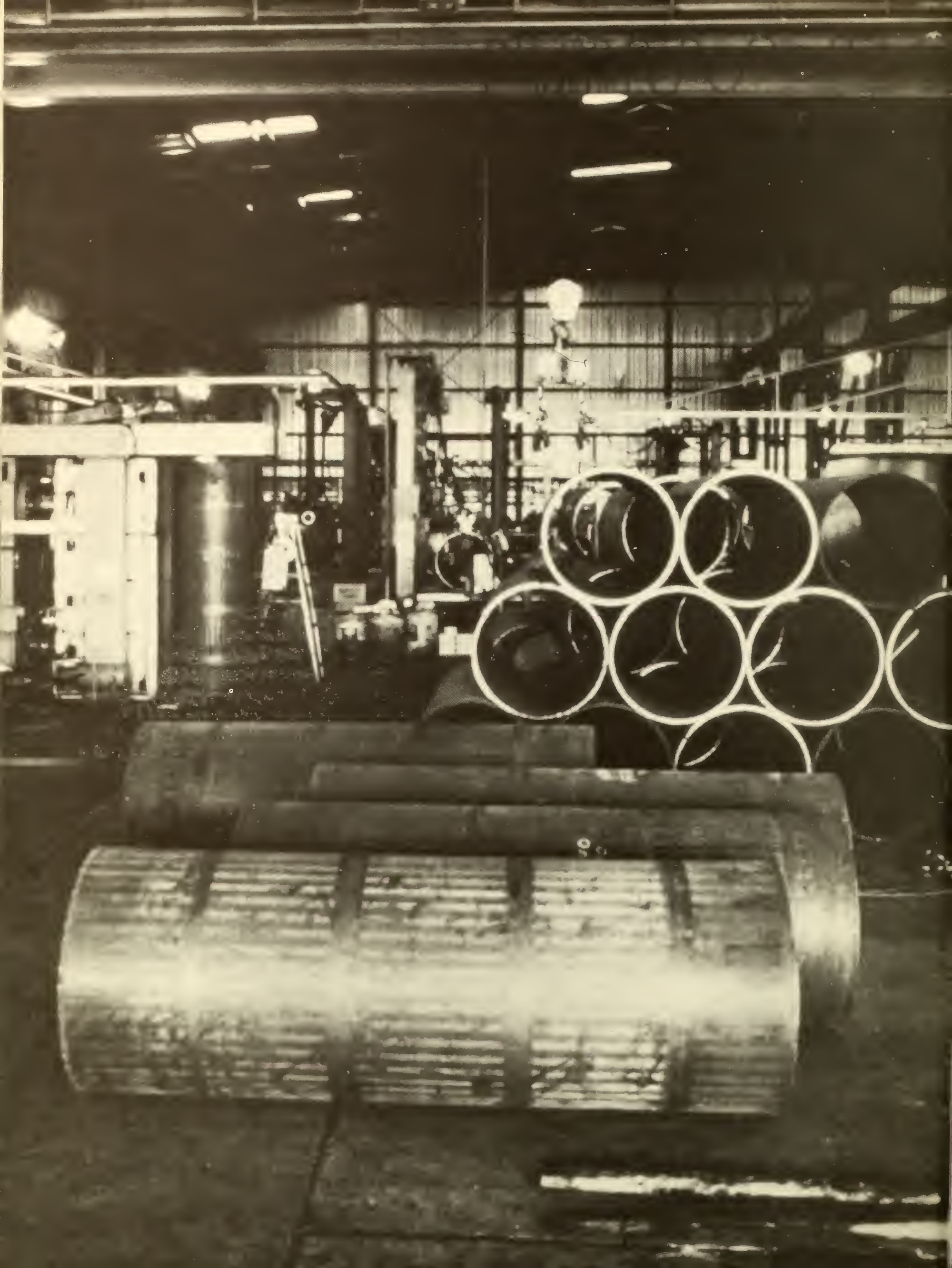
In the years since 1953, some 4 percent of Outer Continental Shelf ocean bottom off the U.S., consisting of almost 15,000,000 acres, has been leased to companies hoping to discover and develop petroleum reserves. Drilling companies, the primary owners of drilling units, have completed more than 23,000 wells on these leases. Indeed, the drilling contractor is considered by many to be the backbone of the offshore oil and gas industry. There are available worldwide today more than 400 drilling units of the three types mentioned, more than 80 percent of them owned by contractors based in the United States. A breakdown of the number of rigs by type shows 187 jack-ups, 136 semi-submersibles and submersibles, and 81 drill ships.

Advances in drilling technology and environmental safeguards have been so great, and the modern drill rig has become so sophisticated, that the risks drilling contractors take these days are principally financial. Along with providing a means for tapping much-needed energy reserves, drilling contractors contribute much more to the nation's economic welfare. They must buy their rigs from shipbuilding companies and other specialty yards. Because the rigs are very costly, this takes a great deal of financing. It is not uncommon for the interest costs each day on an offshore drilling rig to be $10,000 or more. Costs for constructing jack-up rigs range from $10–25 million; for drilling ships, $35–40 million; and for semi-submersible rigs $40–50 million.

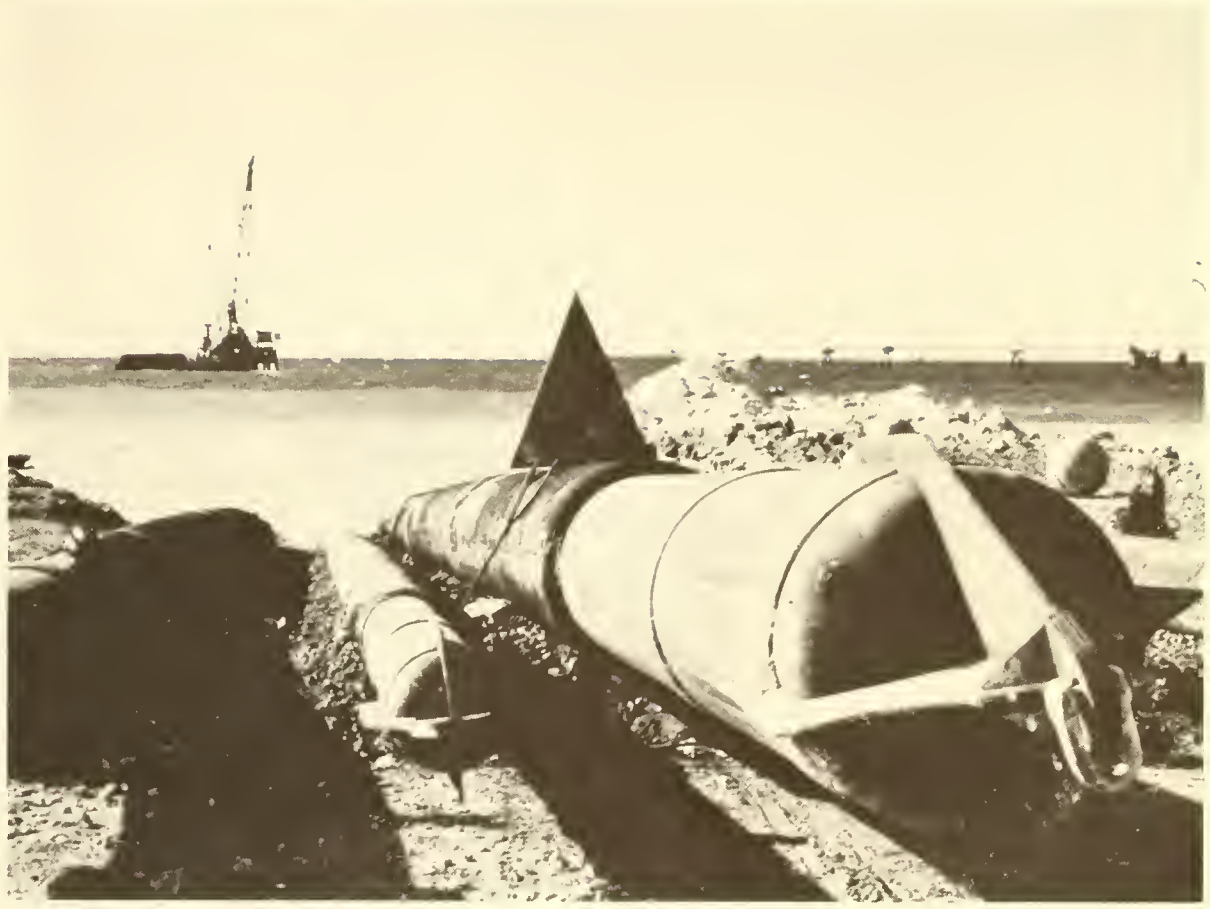
To contract a drilling rig often costs $75,000 per day so this quickly gets to be an expensive proposition. It normally takes three or four months to complete an exploratory well at a drill site, with no guarantee of success or of getting one's money back if drilling turns up a dry hole or marginal production. Even maintenance for an idle rig (one which is not presently under contract) costs about $15,000 per day.

The price a contractor bids on a job is determined to a great extent by his overhead. Rigs built years ago have a competitive edge over those constructed recently—a semi-submersible unit built at a cost of $20 to $30 million a half dozen years ago could easily cost $50 to $60 million if construction were to begin today.

The construction of the drilling units themselves provides numerous jobs, to say nothing of the jobs that result from the need to supply goods and services to the units. All told, there are an estimated 125,000 people engaged in oil and gas operations in the state of Louisiana alone, with 20,000 of them directly involved offshore.



CONSTRUCTION



As the search for hydrocarbons lead drillers into deeper waters, the offshore construction, shipbuilding, engineering, and fabrication companies have met the increased challenges. These firms construct the rigs and production platforms that must maintain stability in deep water, perform, be economical and safe, and withstand the unique forces and pressures of the ocean environment. In the late 1940's, the first steel platforms, out of sight of land in 20 to 50 feet of water, were supported by a "forest" of small pilings. By the mid-1950's, however, the average pile size had increased to a 30-inch outside diameter, which resulted in fewer piles with a more open bracing pattern. By 1955, the largest offshore structure had stepped out to 100 feet of water, and over the next 20 years the seaward movement continued until it reached the 474-foot level. It has been during the mid to late seventies, however, that we have seen the most dramatic technological advances—and capital investment—in the search for offshore oil and gas. In 1976, for example, a two-section platform was installed offshore California in 850 feet of water, but that record was quickly eclipsed when the three-section, 1,265-foot tall Cognac platform was completed in 1,025 feet of water in the Mississippi Canyon offshore Louisiana during the summer of 1978.

The construction industry has not exhausted its capabilities to move into deeper waters and to build for more severe conditions as the search for oil expands. From a practical standpoint construction limitations are more likely to be set by economics than by technology. On the other hand, the need to expand our domestic offshore development of hydrocarbon reservoirs and reduce our reliance on financially burdensome foreign oil imports is obvious.

Very large underwater structures, which, under current technology, cannot be launched as a single unit must be fabricated in two or more sections. For these units to be connected at sea, very close dimensional tolerances are necessary—and the construction industry has demonstrated that it is capable of meeting such requirements. Many offshore construction companies are located in the Gulf of Mexico area. As offshore development expands in other areas, it is likely that much construction will continue at facilities in the Gulf and the structures floated to their offshore positions.

SERVICE

Lifestyles today put special emphasis on "services." To sustain ourselves and achieve our individual goals, we all depend to some degree on goods and services provided by someone else. Two hundred years ago, it was possible for a family to produce necessary goods and services for its own use. In the early years, it was possible for oil drillers to do that too. But with the advent of offshore development and new varying challenging situations, service companies have developed to provide special services to respond to an array of drilling problems. The offshore industry contracts for personalized, special service that the drilling contractor cannot provide for himself.

The nature of a service company's business in the offshore oil and gas industry can be compared with that of the medical profession. Often times the "doctor" is called in when things are not functioning as they should. Service companies "doctor" wells, using everything from preventive medicine to pep tonics to emergency remedial procedures. They monitor, test, research, analyze, compute, diagnose, prescribe, operate, keep records, and otherwise find cures for both everyday problems and big emergencies. They are on call 24 hours a day.

Some of these specialized services needed by oil and gas exploration, drilling, and production operations include: analyzing the fluids to determine how the drilling is going; "fishing" debris (broken tools, etc.) out of the drill hole so drilling can resume; casing the drill hole so the sides will not cave in; core analysis of rocks for data; directional drilling services; cementing, acidizing, and perforating services; oilwell fracturing services which consist of forcing liquids into a sandstone formation to break open the passageways for the oil to be pumped; blowout assistance where special service crews are called in to "cap" wells that have blown out; and other highly specialized services such as workover of old wells, scale removal, fluid level sounding, production testing, downhole packing and plugging; pipe inspection, downhole pressure testing and temperature surveys; and a myriad of other services too numerous to mention. Naturally no one service company does all of these things since they are specialized.

It is easy to understand from all this that proper drilling, completion, and production from an offshore oil or gas well is a complicated, time-consuming, and costly procedure. It is also easy to realize why many service companies are necessary to maintain the high efficiency of recovery and advance our technology as we are required to drill deeper, hotter, and more highly pressurized wells.

The economic impact of service companies in the coastal regions is similar to that of any other business locating in a coastal community—it depends on the need of the business. Many Louisiana towns, for instance, have prospered with the coming of offshore development more than thirty years ago. Along the Atlantic, Rhode Island expects at least 2,000 job opportunities for its local inhabitants once the Outer Continental Shelf lands are leased and developed. One good-sized company in the Gulf area estimates that it has created 48,000 new jobs in the last five years.

When a service company opens a new location in a community, it normally hires a number of local personnel, bringing in only experienced engineers, operations and supervisory personnel. The over-all level of business in the community improves through the multiplier effect of new jobs, because the newcomers themselves provide an influx of new money to local banks, merchants, home-builders, apartment owners, and so on. Government CEIP monies often flow into the area. Government coffers are strengthened through school, property, and sales taxes. The needs of service company personnel are no different from those of local citizens. They are established business and professional people

who remain in the community for the life of the wells in the area—which is usually twenty years or more.

The life of the offshore service company worker can, like others involved in the offshore business, be difficult. He or she is likely to be a college graduate, specially trained to perform a highly technical task, and expected to provide optimum service under the most grueling of conditions. Service companies are often called upon to perform complex jobs very quickly to prevent costly down-time during drilling. The field worker, therefore, puts in long and odd working hours, and sometimes faces difficult transportation problems with no prospects for an easy or quick solution.

Because they are dealing in services, the most important assets of these companies are their people—their experience, knowledge, conscientiousness, and teamwork. The services they supply are necessary to the environmentally safe drilling and production of oil and gas resources.

Typically, when a new area of oil exploration opens up, the major suppliers move in quickly and lease facilities for sales and/or service branches. The first employees are supervisory personnel transferred from other locations, but new employees are hired locally and promoted within their companies as time passes. As long as there is sufficient demand for goods and services, oilfield suppliers will be located close by. How long they stay will be determined by the scope and longevity of oilfield operations—a few months or many years. The presence of the oilfield supply industry does not pose any unusual safety hazards, either to community health or to the environment. Supply companies fall under the heading of light industry, and their safety record is well within the norm for the classification.

Though neither owned nor managed by petroleum companies, oilfield suppliers are a vital segment of the offshore oil and gas industry. They provide the mechanical tools and machinery required for exploration, development and production of offshore energy resources. As one of the many support industries to the financially risky petroleum business, they are also among the beneficiaries of its success.

SUPPLY

Oilfield supply companies lease or sell products used in drilling for and producing oil and gas. The products include capital equipment, such as drilling rigs for offshore platforms; machinery, electronic systems and crew quarters; replaceable hardware, such as chain, hand tools, and disposable parts; and consumable items, such as food, soap, and clothing. They also offer maintenance and repair services for the equipment they sell. In contrast to oilfield service companies, however, they are not responsible for operating the equipment at the job site. This task is left to the equipment suppliers who form a significant part not only of the NOIA membership, but also of the successful offshore effort.

Virtually every type of product used for land operations is also required for offshore work, so most primary oilfield suppliers serve both markets. Offshore operations, however, require additional equipment not needed on land—drilling and production platforms, for example, heavy cranes, long distance communications equipment, anchors, sophisticated positioning equipment and more. Because much of this additional equipment carries substantial price tags, it constitutes an attractive market for specialty suppliers, and provides an expanded market for traditional oilfield suppliers, as well. As with other vital segments of the offshore network, one needs only to pick up one of many trade journals or magazines to see the scope of the supplier companies.

In virtually every situation where there is enough drilling activity to support a supply company, the first into the area are branches or facilities of major supply companies. Currently, for example, there are approximately 750 oil field supply stores in the U.S. which serve as the "general hardware" stores to the drilling industry, wherever it is concentrated. Other businesses already located in those areas—such as welding and fabrication shops, caterers and food service establishments, transportation companies and marine operators—also receive orders for products or services needed in the oilfields.

Following are partial listings of the types of products that fall in the category of offshore oilfield supplies: tubular products; valves; drilling bits; specialty tools; and tool joints. Other specialty supplies needed by offshore companies are common to other industries too and include: computers; cement; hand tools; diesel engines; food; anchors; electric motors; furnishings; chain; wire rope; structural steel; electronic controls, and others.

A recent published market survey projected total industry-wide sales of drilling and production equipment at upwards of $5 billion annually, with a growth rate of nearly five percent annually through 1990.[22]

As of October, 1978, the U.S. Bureau of Labor Statistics reported there were 78,000 people across the nation working for oilfield machinery and equipment suppliers. Of that number, 54,200 were hourly production workers earning competitive wages.[23]

Obviously, then, oilfield supply is a big business with a heavy capital investment of its own. If the average capital investment per employee is $50,000—which may be low by current standards—the total for the industry is approximately $4 billion nationwide.

Depending upon the nature of the supplier's operations, physical facilities can range from a service and repair shop in a small building to an equipment supply warehouse and storeyard covering several acres. If a local shore base is selected, the operation can develop into a sizeable facility requiring many workers, hundreds of acres of marshalling yards, and marine loading docks. In Davisville, Rhode Island, for example, much of the inactive Seabee base at Quonset Point has been leased by equipment and services suppliers to support the fledgling exploration operations 90 miles offshore in the North Atlantic.

TRANSPORTATION

Picture yourself as a skipper or crewman of a vessel 200 feet long that is heavily loaded with tubular goods and other supplies, trying to maintain a position alongside a structure as tall as a 10-story building, while a crane on top of that building is off-loading your cargo and the seas are running 16 feet high. Now you can understand why transportation is still one of the most colorful and exciting of the offshore service industries.

It is also one of the most important. Today's marine transportation industry provides a multitude of services—running seismic and other underwater research surveys; towing giant drilling rigs, barges and dredges to exploration sites; handling anchors as huge pipelaying barges slowly move forward; moving towering production platforms from fabrication yards to their offshore destinations; placing and retrieving deep-water mooring systems; serving as mobile workshops and fabrication plants; inspecting offshore structures and equipment; handling large diameter hoses; transporting the materials these rigs and platforms need from shore bases to the area of exploration or production; and more.

Prior to 1947, when the search for oil and gas had gone seaward only as far as the marshlands of Louisiana, petroleum companies and drilling contractors had only limited use for marine equipment, except for small crewboats, tugs, and various types of utility vessels, such as "jo-boats," which worked primarily in bays, inlets, and other protected areas. As the industry moved farther offshore, however, the need for better boats and other marine equipment became apparent. Early crewboats and supply vessels—converted yachts, fishing craft or home-built models produced by tiny bayou boatyards—started an evolutionary progression that continued on through wooden shrimp trawlers, oyster luggers, menhaden boats and surplus Navy craft to today's very sophisticated, specialized, and expensive vessels.

These modern craft are of unique designs, developed for use only in the marine transportation industry. Generally, helicopters carry crews to the rigs and the service boats deliver the supplies. Cargo or supply boats average 180 feet in length, with a raised pilot house forward and a large clear deck area aft. These vessels do not have cargo holds, but use instead the clear after deck for transporting the large quantities of pipe, casing, cement, mud, and other materials so vital to petroleum exploration and production offshore. This type of vessel was developed because the traditional cargo vessel, carrying supplies in a deep hold, cannot be safely and efficiently loaded or unloaded in rough weather in unprotected waters. The specially designed cargo boats can load or discharge at a drilling rig or production platform in all but the roughest weather.

As the working distances from land increase, the logistical problems of offshore operations intensify. Greater skills and experience are required; supply vessels must have more speed, more carrying capacity, and increased capability for sustained self-sufficiency under varying sea and weather conditions. The result has been a trend toward larger and more powerful vessels, with modifications of equipment that in some cases have led to the evolution of entirely new classes of ships. Towing-supply vessels and cargo-crane vessels are typical examples.

In addition to performing such routine operations as supplying drilling units and production platforms and towing rigs, many of these sturdy, seaworthy craft have the ability to preposition, recover, connect, and install moorings with waves cresting higher than 10 feet and wind velocities in excess of 35 MPH. These boats are in great worldwide demand because of their excellent performance capabilities.

Another modern breed of workboat is the cargo-crane vessel, which was designed specifically to perform in areas where big offshore equipment is not feasible. These vessels provide the offshore industry with a unique and flexible integral marine support system. By combining extreme mobility with moderate lifting (300,000-plus pounds) they can, in some cases, eliminate the need for extra vessels to perform limited construction functions. They not only get to the location under their own power, but are able to maneuver themselves into precise position with no outside help.

Other features on modern vessels include fire-fighting equipment as well as equipment exclusively dedicated to pollution control and environmental protection on a stand-by basis. Ready to get underway almost instantly in the

event of an incident, they are manned by crews trained to deploy booms, handle skimmers, and operate slop barges. The offshore marine services segment of the industry is capable of augmenting that fleet of specialized craft, if need be, by performing whatever back-up support tasks are necessary to control and minimize the effects of any spill.

In essence, the basic function of the offshore transportation fleet is to provide marine support for the offshore oil and gas industry, and other ocean related industries. Support services for the evolution of an oil and gas field may be divided into three categories:

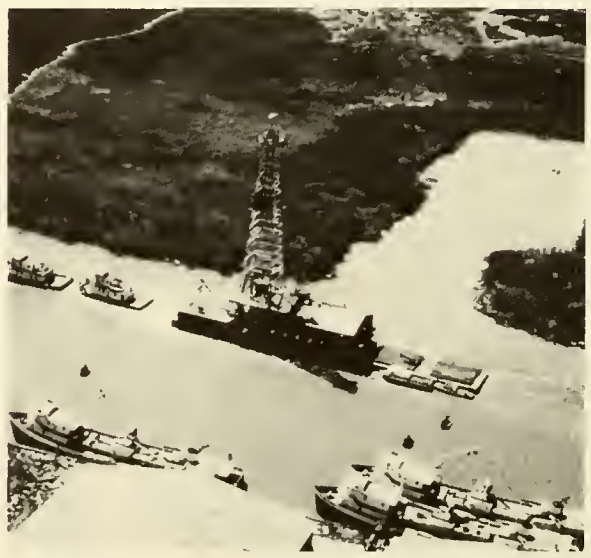
Phase I: The process begins with 2–4 years of exploration activity. This phase starts with seismic vessels obtaining the detailed geophysical/geological data discussed previously. Once a drill site is decided upon, ocean-going tugs move the drilling units to the site and moor them. Anchor-handling and mooring these giant rigs is a highly specialized task requiring expert seamanship and precise navigational skills.

Offshore drilling creates a constant demand for enormous amounts of drilling materials and supplies. Moving these necessities to the rigs and platforms is the bread and butter of the offshore transportation industry. Vast amounts of drill pipe, drilling mud, cement, drill water, steel casing, chemicals, and various other types of supplies, including food and water for the people working aboard the rigs, are carried aboard supply vessels which run day and night between offshore locations and onshore supply bases.

Phase II: Successful exploration efforts, the delineation and development period, may span 3–5 years. Tugs, barges, supply and crew boats are among the craft used to support the installation of the fixed platforms, development drilling, and offshore construction as the facilities for the production, transportation, and storage of the product are put into place.

Phase III: Finally, some 5–7 years after exploration began, the production phase, which may last 20 to 30 years, begins. Here, too, vessels find work, including support of maintenance, workovers, and inspection of production platforms as well as the servicing of other offshore transfer facilities where the giant tankers that move the product to markets throughout the world are loaded.

A major requisite for success in the offshore transportation industry is having a sufficient diversity of equipment throughout the world to be able to take advantage of changing conditions in any given area. But perhaps even more important are the diversity of skills and talents of many dedicated people—the deck hands, vessel masters, mates, engineers, and executives that go to make up the boat company. As in any other business endeavor, if the mix is of high quality and the product output is dependable, the likelihood of a successful operation exists.



With virtually all of the world's oceans now rapidly coming within the scope of the industry's technological ability to explore and develop the natural resources, there is still a tremendous amount of growth potential in the marine service business. The real challenge today is created by the restrictions that prevent the marine transportation industry from having the freedom it needs to be innovative and effective in providing the energy the country so desperately needs.

The offshore industry developed out of ideas that only a handful of believers thought would work. The projects were not subsidized by the government, but neither were they confronted with the multitude of regulations that industry must face today. Offshore rigs and the necessary marine support services evolved in an era that does not exist today—an era of neither subsidization nor intervention, and, therefore, one of looser reins and greater incentives.

DIVING

Any effort to develop ocean resources requires that divers develop capabilities to enter and work in an environment which is both alien and hostile. Like an iceberg, the largest part of most offshore installations is under water, with only a small portion reaching above the waves where it is accessible to construction, inspection, and repair by conventional means. The lower portion of offshore oil platforms, pipelines and well heads, as well as other underwater structures for military security and fishing, are accessible only to a small group of workers using highly sophisticated techniques for life support in the underwater environment.

Divers have always been an important part of exploring for and developing ocean resources. The search for offshore petroleum has been the single most significant factor in stimulating improved methods of working under water. Prior to the development of offshore petroleum, diving was limited to a small group of individuals engaged in salvage or military activities or divers who harvested abalone and sponges from the ocean's floor. As the rigs moved offshore, a considerable investment was made in pipelines and platforms, principally in the Gulf of Mexico. Beginning in the early 1950's, divers became increasingly important to assist in the construction of these offshore facilities and, later, in regular inspections to determine that the effects of the ocean environment were not creating potential problems or hazards.

Since early offshore development efforts were in relatively shallow water, divers used standard diving techniques, breathing air while working at the end of a hose tended from the surface. Beginning in the early 1960's, however, offshore development moved into water depths beyond the acceptable maximum range for air diving, about 200 feet. It became necessary to develop diving techniques using other gas mixtures which would avoid the problem of nitrogen narcosis, or "rapture of the deep," which results from breathing air at high pressure.

Borrowing from development work carried out by the U.S. Navy, the commercial diving industry began to conduct experiments, both in the laboratory and in the ocean, to develop deep-diving techniques. The results were suc-

cessful, and today divers can work in water depths as great as 2,000 feet, although the vast majority of dives take place in less than 400 feet of water.

Divers serve as the eyes and ears of the engineers and construction experts who install and maintain the facilities necessary for offshore development. A number of techniques have been devised which enable suitably equipped workers to perform a wide variety of mechanical tasks under water, including welding, drilling, and repair and maintenance functions. Divers also use underwater television cameras and video tape recorders to inspect and preserve records of the condition of offshore platforms and pipelines. With this inspection information, the engineers responsible for design and maintenance of the structures can analyze the condition of their facilities and anticipate any deterioration which might occur. Should it be necessary, divers are then sent down again to take corrective measures or perform preventive maintenance.

In situations where damage may occur to pipelines or platforms as a result of storms, collisions, or other accidents, divers are called on to make immediate repairs to prevent the leakage of petroleum products into the ocean, or danger to the lives of offshore workers.

Today, several thousand people are involved in this rapidly growing aspect of offshore development. Many millions of dollars are invested in the sophisticated equipment required to work at great depths, and a number of local business enterprises are called upon to provide support to diving operations all along the coastlines of the United States.

While the general public tends to view divers as being both brave and insane, they are, in fact, a highly trained group of professionals providing an essential capability to the safe and effective development of offshore resources throughout the world.

SHIPBUILDING

Americans have been shipbuilders from early colonial days. In 1630, Governor John Winthrop of Massachusetts helped to establish the first organized shipyard on the Mystic River close to Medford, Massachusetts. In 1641, the General Court of Massachusetts proclaimed the building of ships to be "of great importance for the common good." Skilled shipwrights were recruited from England. Shipbuilders were given land grants and favorable tax treatment. Ships played a basic role in the movement of food, goods, ideas, people, and, thus, in the development of our country.

Transportation was a vital link between the colonies, and coastwise shipping was facilitated by their geography. From this start, the shipyards of New England produced the Yankee Clipper Ship which sailed worldwide. At the beginning of the 19th century, these graceful Clippers and their Yankee crews virtually dominated world marine transportation.

In the gold rush days of the mid-1800's, the Clippers became a vital transportation link with California and were probably as important in the expansion of the Nation to the West as were the Conestoga wagons.

The use of iron and steel for the hulls of ships and the evolution from sail to steam, however, ushered in a new era of shipbuilding. At the close of the 19th century, orders for steel naval vessels and merchant ships brought the U.S. shipbuilding industry to a high peak of production, but England led the world.

When the United States entered World War I in 1917, a phenomenal growth in shipbuilding was necessitated. Many new shipyards were created, and employment in the industry increased to more than 500,000 from the 1916 figure of 70,000.

After the Armistice, the Conference for Limitation of Armaments resulted in an agreement by major naval powers to curtail naval construction in 1922. This caused the overnight cancellation of many United States Navy orders and depressed the industry.

About the same time, the Congress, in 1920, declared that 50 percent of U.S. imports and exports should be carried in United States ships, but this goal was not reached. In 1927, only 30 percent of U.S. trade was carried by U.S. ships.

The Merchant Marine Act of 1928 was later intended to provide assistance and favorable loan conditions for the shipping and shipbuilding industries; but, after the crash of 1929, employment had fallen to 10,000 by 1933. At this point, President Franklin D. Roosevelt proposed a bill, which the Congress enacted, making $130 million available for naval ship construction in private shipyards. By 1935, 80,000 shipyard workers were employed, but only two merchant vessels for operation in world trade under the American flag were under construction.

There followed, again with President Roosevelt's impetus, the Merchant Marine Act of 1936—a landmark statute for the U.S. shipping and shipbuilding industries. It created a mechanism for government subsidies for construction and operation of ships in foreign trade. In many respects, this Act has been effective, but many of its objectives have fallen short of perceived aspirations.

The rationale of the 1936 Act and the portents of World War II,

nevertheless, initiated a shipbuilding program of vast proportions for both naval and merchant ships. In the 1941–1945 period, approximately 1,600 naval ships and 5,800 merchant ships were built in this country. Included were nearly 2,700 Liberty ships, 400 Victory ships and 700 tankers. Sixty shipyards with 300 shipways and, at top production, nearly 1,500,000 workers were involved. Historians have characterized this prodigious feat of shipbuilding as the "bridge of ships."

At the end of the war, many of these shipyards were closed. Many ships went into lay up or were later sold to interests in other countries. U.S. maritime endeavors, as a consequence, drifted for nearly a decade.

In 1955, however, the Maritime Administration sponsored a program for the replacement of obsolete ships by subsidizing shipping companies which rejuvenated the general cargo (liner) segment of the U.S. shipping fleet. In 1970, the Congress again

amended the Merchant Marine Act of 1936 to stimulate merchant shipbuilding. By this action, it was envisioned that 300 merchant ships would be constructed over a 10-year period. To date, however, contracts for only 80 have been placed.

These facts need to be put into perspective. For all practical purposes, the United States remains an island nation, where ocean transportation of goods is a vital link. Yet, U.S. flag shipping presently carries less than five percent of U.S. exports and imports. This discomforting heavy reliance on the vessels of other nations is accentuated by the fact that 69 of 71 critical and strategic materials, without which the entire U.S. industrial structure could not function, must be imported by ship. In addition, U.S. dependency on more than 20 of these items ranges from 50 to 100 percent. The role of ocean shipping—and downstream shipbuilding—as a function of national security is, therefore, dangerously unbalanced.

As related to shipbuilding, it needs to be stated that the U.S. industry is not monolithic. There are large shipyards, and there are small shipyards. There are also those which do not fit the classic definition of a shipyard—that is, possessing either a building way, building dock, launching platform, or a drydock. There are yards that specialize in naval shipbuilding, others engage only in merchant ship construction, and some build both naval and merchant ships. Particularly on the Gulf Coast, there are those that build only drilling rigs and those that build oil industry support vessels. There are yards whose primary activities center on the construction of barges and other shallow draft vessels. Still others restrict their operations to ship repairs and ship conversions. On the other hand, there are those which build and also repair and some, large and small, engage in non-ship activities as well. There are both privately owned and government owned facilities. All, of course, are located adjacent to navigable waters.

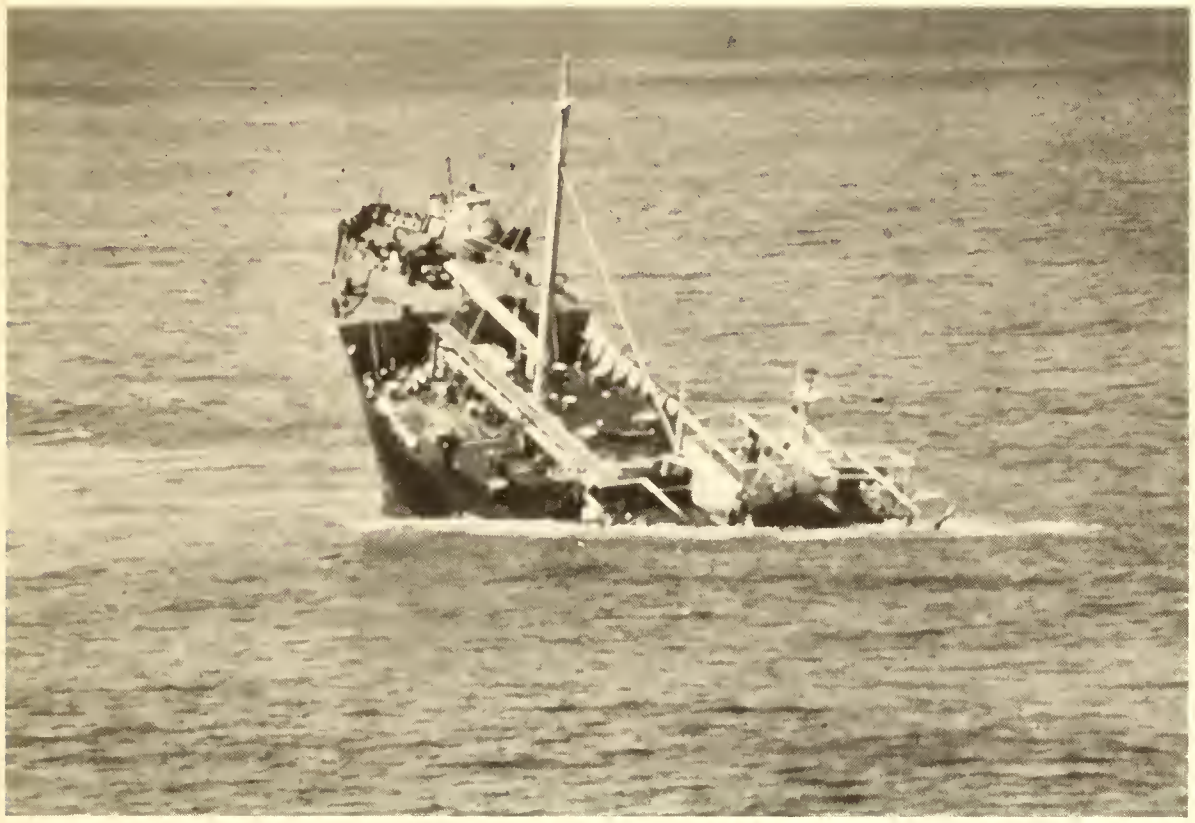
In all, this complex includes more than 500 establishments. Government statistics, however, are normally predicated on some 150 principal privately owned yards of which 48 have the capacity for building or accommodating ships 475 feet or longer. Of this latter group, some 30 private facilities, in a very substantial sense, compose the nation's industrial shipbuilding resource base.

Slightly more than 175,000 workers, as of the start of 1979, were employed in the private sector of the U.S. shipyard industry.[24] Another 70,000 were on the rolls of the naval shipyards. Despite advances in technology and constant increases of capital investments, the industry remains labor intensive. In addition, because of the fact that approximately 50 percent of the value of a ship (about 70 percent in the case of naval vessels) is represented by the cost of materials and components purchased by the shipbuilder from virtually every state in the Union, another 300,000 workers in supporting activities are directly involved in the ship construction cycle. Conservatively, applying the theory of economic multiplier, it can be said that some 600,000 people of the United States derive their livelihood from shipyard contracts of all types.

Shipbuilding yards do not seriously affect surrounding water quality and generally are not problems to coastal environments. Ship repair yards have different problems. Their work often entails cleaning of fuel tanks and cargo oil tanks. Oil residues, oil water, sanitary wastes, and bilge water are pumped ashore for treatment and disposal according to stringent government requirements. Sand blasting, as part of repainting, generates the possibility of heavy metals in the waste materials. These residues, however, are carefully removed from drydock floors before the dock is submerged to refloat the ship.

The declared policy of our country—since Colonial days—recognizes that shipbuilding and shipyard facilities compose a basic and vital element of the national security assurance structure of the nation. There is little doubt on this point, and lasting evidences abound. For example, at the close of World War II, President Harry S. Truman declared: "The shipbuilding accomplishments of the United States not only astonished the world, but more than that, defeated the enemy." Today those words, voiced in retrospect, provide an unchallengeable statement of the continuing importance of shipbuilding to U.S. national interests.

MARINE SALVORS



The need for marine salvage is as old as seagoing itself. The modern marine salvage industry developed after the Industrial Revolution, but its roots go back to antiquity, for ships and their valuable cargos have gone ashore or sunk since man first set out to sea.

Salvage services are required by almost every shipowner, but, fortunately, not on a regular basis. This irregularity, and the inability to know in advance the conditions under which salvage will have to be carried out, combine to make marine salvage a risky and speculative business. Salvors often experience periods of inactivity—and then spurts of frantic action. The salvors' high risk led to the development of the "no cure-no pay" salvage contract, the salvor doing his work in expectation of substantial payment at some future date—or no reward at all if he fails.

Early salvage efforts were devoted to the removal of valuable cargo and, on rare occasions, the raising of sunken vessels. From ancient times until the mid-19th century, those who undertook to save cargo, equipment, and crews of ships piled up on the shore were known as "wreckers." These entrepreneurs concentrated in coastal areas most hazardous to shipping, waiting for ships to be driven ashore. While most wreckers performed a valuable service along the coasts, some inevitably appeared who lured ships ashore, and whose assistance and tender ministrations the crews of wrecked vessels seldom survived.

In the first half of the 19th century, with the development of steampowered tugs and the introduction of steel as the principal shipbuilding material, the technical foundation of the modern marine salvage industry was laid. For the first time, stranded ships could be salved—and the image of the wrecker as a predator and near-relative of the pirate began to fade, supplanted by the evolving picture of the modern salvor, a skilled seaman working under the most difficult and dangerous conditions.

In the mid-19th century there were almost no navigational aids and little regulation of ship seaworthiness, crewing, or loading. Ships often went to sea dangerously overloaded or improperly manned. The result was that in 1860 a very high percentage (6 percent) of the total value of American exports was lost to shipwreck, and marine insurance rates increased dramatically. The Board of Marine Underwriters of New York City sought to alleviate the distressing situation by putting marine salvage in the United States on a professional basis.

Just prior to World War I, conditions on the West Coast were not conducive to successful salvage operations, as ships break up quickly on rocky coasts, and salvors working there have had to be imaginative in developing methods that bring reasonable success. In the period between the World Wars, the industry continued to grow and spread. Many smaller salvage companies failed to survive the great depression of the 1930's, especially in Great Britain, where the industry was practically wiped out, leaving the government-subsidized Dutch and German firms almost a free hand in northern European waters. The failure of the British salvage firms had far-reaching effects, for with the outbreak of hostilities in 1939, the Royal Navy and the Atlantic convoys had little or no salvage support. Numerous ships which could have been saved were lost.

This hard lesson was not lost on the U.S. Navy. Just before Pearl Harbor, the Office of the Supervisor of Salvage, USN, was established to ensure that a viable commercial salvage capability would be maintained in the United States. After American entry into the war, salvage organizations were established in both the Atlantic and the Pacific fleets, and supported by a realistic training program that produced highly skilled salvage officers and divers quickly.

Having noted the difficulty of building a salvage force from scratch, and recognizing the necessity for maintaining a marine salvage capability, the Congress in 1946 passed two statutes which protect and encourage the salvage industry. One, the Cabotage Act (46 USC 316)—cabotage means "navigation or trade along the coast"—prohibits foreign vessels from engaging in salvage in the coastal waters of the United States. The other, the Salvage Act (10 USC 7361 *et seq*), ensures that a viable salvage capability exists in the U.S. not only as a matter of necessity for wartime but as an adjunct to peacetime marine operations. The Act accomplishes this by authorizing the Secretary of the Navy to provide for ship salvage by contract, and by authorizing him to assist the industry in maintaining a responsive capability.

The period since World War ll has been one of growth for the world salvage industry, a growth that has been enhanced by generally increased marine transportation, increases in the size of ships, and especially by the activity associated with offshore petroleum operations and other industrial efforts in the ocean. The latter work involves towing heavy structures, emplanting them, anchor handling and mooring, structure removal, and many other skills common to marine salvage operations.

The rapidly advancing technology and generally sound economy of the postwar years has brought a number of new salvage firms into existence.

Fierce competition is normal among marine salvors. This competition is most dramatically demonstrated by the traditional salvor's race to the scene of a maritime casualty. This race had real significance in the days before radio communications provided rapid transmission of instructions from owners to ship masters. ln those days, the first tug on the scene was in a position to negotiate a contract quickly and effectively with the master of the distressed ship. ln modern times, the real competitive drama goes on far from the scene in the offices of salvors, owners, and underwriters. lt is here that the owner, acting on the advice of the underwriters and salvage association, decides to whom the work will be awarded. The salvor who reaches the scene first enjoys a tactical advantage during negotiations, but is not assured of receiving the work.

While some salvage companies maintain permanent stations, not unlike the firehouse concept, it has become increasingly more effective to operate salvage bases from which additional or specialized equipment can be mobilized for specific operations.

Salvage is a high risk business. The salvor often hazards his own equipment in his operations, and salvors have on occasion suffered heavy loss. As the salvage industry grew away from the informal arrangements of the wreckers, the Lloyd's Standard Salvage Contract, popularly known as Lloyd's Open Form, developed and has prevailed. Under this unique form of business arrangement, the salvor agrees to use his "best endeavors" to salve the ship and/or cargo, with the services rendered on the principle of "no cure—no pay." The salvage award is decided through arbitration in London by the Committee of Lloyd's. lt is normal for the salvor to require that security

be posted with Lloyd's before delivery of the ship to her owner.

Although this form of salvage contract has withstood the test of time, it has some distinct disadvantages. Using the Lloyd's Open Form, the salvor commits his assets to an effort for which he will not be paid if he is unsuccessful; and even if he is successful he may wait for two years to know how much money he will receive—without any possibility of advance payment and with the chance that exchange rate fluctuation and interest rates may make it advantageous for the ship owner to delay settlement. Faced with this kind of payment prospect, an increasing outlay for equipment and increased liability resulting from ecological considerations, more salvage companies are accepting contracts on a daily rate or fixed price basis. If he is to expect a profit for particularly difficult operations where the risks, potential liabilities, and capital outlay are large, the salvor must negotiate a daily rate rather than accept the uncertain traditional "no cure—no pay" contract. Daily rate contracts are particularly necessary for those salvage cases where the casualty must be removed for political or ecological reasons, but would not normally be a profitable salvage.

Because of the large number of unknowns affecting the execution of any salvage, fixed price contracts are accepted only when conditions are well established and the salvage can be carried out in a predictable manner. This generally applies to the removal of wrecks.

Most salvage companies permit tug masters or salvage masters to sign Lloyd's Open Form when immediate action is necessary to prevent loss of property, but require home office approval for fixed price or daily rate contracts.

With well over a thousand fires, breakdowns, strandings, and other marine casualties predicted annually, and with more and larger ships continually going into service, the marine salvage industry performs a highly responsible role in protecting the environment. Large bulk carriers, container ships and others with no self-contained cargo-discharging ability, Very Large Crude Carriers (VLCC), Ultra Large Crude Carriers (ULCC), Liquified Natural Gas (LNG), and Liquified Petroleum Gas (LPG) carriers all present some new problems in cargo discharge and the handling of dangerous cargoes which will require the development of new and innovative techniques. Other new techniques and measures, some quite expensive, will be necessary to control pollution and environmental damage accompanying marine salvage operations. The necessity for providing many types of environmental protection adds a new dimension to the business of salvage. Traditionally, payment for salvage by the owner is based on the value of the property saved. But what value can be placed on saving an owner from a liability claim associated with a pollution incident?

The dozens of marine salvage firms dotting our coasts from Maine through the Gulf of Mexico and up to Washington provide thousands of job opportunities—to office workers as well as to the special breed of individuals who practice this difficult and sometimes dangerous profession. In addition, millions of dollars in ships and valuable cargoes are saved every year from a variety of marine casualties. About 20 percent of this activity involves saving tankers and oil barges, thereby contributing directly to helping our energy problems.

Increased ocean industrial activity—petroleum exploration and production, mining, ocean floor emplantment, construction, and recovery—will require more involvement by the marine salvage industry and the special seamanship talents of its people. The increased availability of air transportation will reduce the time required to bring salvage equipment and skilled salvors to the scene of an accident, and immediate skilled assistance can save ships which would otherwise be lost. Air transportation may also allow a salvor to serve a wider region from a single salvage base.

There is a subtle attitude often found in the management of salvage firms. This attitude has to do with a sense of public service. Salvage is a service business, but salvors seldom, if ever, advertise their services, for to do so would give notoriety to a client's misfortune. Salvors see theirs as a service dedicated to saving lives, property, and the environment, and are very conscious of the reputation they earn, particularly in the communities they serve.

FISHING

Fishing was perhaps one of the first coastal industries necessary for the American people. Today, shell and fin fish food industries contribute to our vital protein supply and their roles are well known in our heritage. But, the ocean industries are also made up of the menhaden fishing industry which accounts for more than forty percent of the commercial tonnage of fish landed in American waters. Even though this fishing industry is largest from the point of view of tonnage landed, it is not as well known because the products are not used directly for human consumption. The menhaden fishing industry has long contributed to America through productive and safe operations on the coastal zone. Rather than a standard accounting of fishing in general, the menhaden industry—of which virtually all companies are NOIA members—provides a useful example of rich history, a vital industry, and environmentally safe operations to all concerned about wise coastal use.

As the first settlers began to arrive and establish their colonies in America, it was soon realized that along with food, water, and clothing, their existence depended upon a source of oil for lamps, leather tanning, manufacturing, and for various other uses. Lacking knowledge of oil from fossil sources, the early settlers turned to the only source known to them, the sea and oil from whales. Commercial fishing for whales to supply the needed oil soon became one of the first major industries in America. As towns and cities sprang up along the coastal areas, the demand for oil became so great that high prices caused whales to be greatly overfished. This overfishing brought about the collapse of the whaling industry during the mid-19th century.

During this early period, the Indians taught the colonists to use fish found in great abundance to fertilize their crops. The Indians called these fish "munnawhatteaug" from which the present day common name menhaden was derived. Unpalatable as a table fish, and lacking game qualities, their great abundance made them a bounty of the sea to be used for other purposes.

Legend is that about the time the whale fishery was collapsing, a Maine farm wife boiling menhaden to feed her chickens discovered that a considerable quantity of oil came to the surface. She skimmed off the oil and found it to be an adequate substitute for expensive whale oil. Thus a new industry was born which supplied a new source of fish oil. Commercial fishermen in sailing vessels using purse seine nets set out to capture schools of menhaden that appeared along the near shore coastal area from late spring to late fall. Small menhaden processing plants with various methods to process menhaden for oil sprang up all along the Atlantic coast. In addition to the oil produced, solids from the processing operation continued to be used for fertilizer until the 1930's.

As is true in most American industry, competition for fishing grounds, processing methods, and sales of products became determining factors for survival in the menhaden industry. Many of the small companies closed or were acquired by larger companies in the early years of the industry. After a while a few large companies emerged to develop the menhaden fishery today into the largest commercial fishery in the United States, by volume of catch.

Although attempts had been made in the early 1940's to develop a menhaden fishery in the Gulf of Mexico, it was not until after World War II that industry made the necessary innovations to bring this about. With post war development of synthetic netting, the power block, aluminum purse seines, refrigerated vessels, fish pumps, radio communications, and aircraft to spot the schools of fish, production from the Gulf fishery soon exceeded that of the Atlantic fishery.

Uses of menhaden products are many and diversified. Products produced fall into three general product classifications: fish oil, fish meal, and fish solubles. Fish oil, because of its polyunsaturated fatty acid content, has found widespread use in the manufacture of margarine and shortening in Europe and Canada. Most of the oil exported for this purpose comes from the Gulf fishery and represents more than 75 percent of the menhaden oil produced in the United States annually. Menhaden oil is used

domestically in the manufacture of paints, resins, putties, and caulking compounds, lubricants, soaps and detergents, varnishes, waxes, ink, electrical coatings, and various other applications.

Fish meal, rich in protein, vitamins, minerals and other essential nutrients, is an important ingredient in the diets of poultry, hogs, and other farm animals. Menhaden industry technicians working in fully equipped laboratories in cooperation with nutritionists have developed poultry diets using fish meal to the point that more is now known about the nutritional requirements of the chicken than any other animal. Due to the valuable protein or amino acid content, represented by the high proportion of methionine and lysine, efficient high-energy diets can be formulated by computer techniques which result in a faster growth in a shorter time at a reduced cost. Fish solubles, a product made by evaporating the remaining liquid after the oil is separated, contains high concentrations of soluble protein, vitamins, and other nutrients. This product is also used in diets of poultry and farm animals.

Continued research in product application technology has caused the menhaden industry to become a vital part of the United States economy. Menhaden supplies nearly 75 percent of all fish meal, 95 percent of the fish oils, and 80 percent of all fish solubles produced annually in the United States. Export of menhaden products to foreign countries contribute a substantial amount toward the U.S. balance of payments.

With the United States population expanding from 80 million in 1900 to over 220 million at present, and with predictions that the earth's population will double in the next 35 years, the need for protein food becomes increasingly important. The renewable natural resources from coastal areas will be depended upon more and more as a source of this needed protein. This can be accomplished in part by proper management of available stocks, with harvest of the resource directed toward the maximum sustainable yield. A more important role in maintaining this supply of protein from the coastal areas will be played, however, by the expanding population itself. As the human population grows, greater demands will be placed on coastal areas to support the development of cities, harbors, industries, recreation, and many other uses. Without proper coastal zone management, the delicate balance of life in the sea will be seriously threatened.

The menhaden industry has inevitably been involved for many years with conservation and preservation within the coastal zone. We will continue to share in responsible actions that will protect it, improve it, and perpetuate the delicate balance of life where land and water meet.

DEEPSEA MINING

Imagine dangling a long soda straw off the Empire State Building and trying to suck up grains of wet sand off the sidewalk. Imagine doing it in a high wind ... with a very flexible straw ... in total darkness so you can't see the street below. This is what mining for valuable minerals from the deep seabed is like. Rather than grains of sand, the prize is known as nodules.

The elusive nodules are fist-shaped chunks of ore lying on the seabed which are important because they may someday help reduce America's dependence on foreign sources of vitally needed minerals. The nodules are abundantly strewn across the deep ocean beds, but as the "straw" example illustrates, getting them three miles up to the surface through a slender pipe is an engineering feat of no small distinction. So it's easy to get an idea of the problems in vacuuming up manganese nodules in the not-yet-established ocean industry of deepsea mining.

Nodules are not a recent discovery, but their potential value is. As long ago as 1872, HMS CHALLENGER dredged nodules from the depths of the Pacific on a scientific voyage. But they gathered dust in the British Museum as interesting, but useless, oddities of the deep. These grey-black nodules are composed of varying mixtures of oxides of manganese, cobalt, copper, nickel, and silica, plus traces of a dozen other elements.

Looking to the future, nodules could be extremely important. Without manganese we cannot make alloy steel. Without cobalt we cannot make jet engines, cutting tools, or tool steel. Today America imports approximately 98 percent of our requirements of primary manganese and cobalt. In the case of nickel, we import more than 90 percent of our total consumption; and although the United States is the largest copper producer, we nonetheless import some 15 percent of our copper requirements. The net imports of these minerals amounted to more than one billion dollars in 1977, a significant balance of payments figure.

Unlike the case with our nation's high dependency on petroleum, reliance on foreign sources of hard minerals is not critical at this time. Most experts say that because of the diversity of interests among both developed and developing producer countries, there is little current likelihood of cartelization of these minerals.

Still, we must begin now in exploring deepsea mining as a viable ocean industry for America in the future. The need to examine the challenges and promises of deepsea mining cannot, because of the tremendous lead time, wait until America is effectively "shut down" for lack of vital materials.

There are telling indications that this is beginning to happen and may be critical as early as the mid-to-late 1980's.

Today, land-based mining is becoming increasingly expensive both in terms of investment and energy consumption. New mine development has become increasingly difficult because of the unfavorable investment and political climate in many producer countries. Prudence clearly dictates that we have access to as many sources of mineral supply as possible.

A thriving deepsea mining industry could by the end of the 1980's significantly increase our supplies of copper, cobalt, nickel and manganese. This might have a stabilizing effect on prices which are likely to increase for marginal land-based mineral sources. Such price increases could have an inflationary effect upon our economy, and have an adverse effect upon the development goals of some poorer nations. In addition, a healthy seabed mining industry could provide other benefits to our nation in the form of a more favorable balance of payments, technological advancement, and some additional employment.

A thriving deepsea mining industry is still a long way off. It is estimated that a single, full scale ocean mining operation (including transportation and processing facilities) would cost from $750 million to $1.2 billion. In addition there are no guarantees against losses, and uncertainties also exist relative to the ability of industry to live with the still undeveloped U.S. regulations, or international accords governing deepsea mining. One decided plus is that the nodules are continually forming.

Scientists have determined that the nodules grow by precipitation of minerals out of sea water. Through the use of deepsea cameras we realize that some parts of the high seas are literally carpeted with nodules in mind-boggling numbers. One estimate puts their total weight at some 1.5 trillion tons. There are 330 million cubic miles of ocean water on our planet, and each cubic mile contains about 165 million tons of minerals floating in solution ... everything from common table salt to traces of gold.

The nodules "grow" one ion at a time when some of the heavier metals attach around a nucleus such as a scrap of debris, a shark's tooth, or a small piece of whale bone. Over the millenia, they may attain a mean diameter of about three to four inches. As growth occurs through the eons of time, tiny layers of clay get mixed in, so that the nodule grows in concentric rings around the core. Slice a nodule in half and you can see growth rings like those at the end of a log. By holding an average size nodule in your hand you are looking at maybe 40 to 50 million years of growth.

Many people now working with deepsea mining have been involved in offshore oil and gas operations. The years of experience many have had in handling the stress of long pipe thousands of feet in the earth are helpful in instrumentation, coupling of pipe joints and the like. This helps one understand the interdisciplinary nature of the ocean industries. Technologies developed in one industry can assist other ocean industries as well as our way of life in landbased operations. Concerning another frontier, for instance, miniaturized circuits are a direct result of technology transfer from our nation's space achievements.

There is no direct coastal zone impact from deepsea mining because all mining sites are on the "high seas" and outside the territorial waters of the United States (or any other country). But coastal areas would host port facilities for the mining ships and transportation carriers, as well as processing facilities for the minerals recovered.

When a ship arrives at the mine site, its crew launches a dredgehead over the side, attaches and deploys 750-foot hose sections, and then hauls them to the derrick located over a hole in the ship's bottom. Then, attaching more than 400 sections of pipe, one by one, the sledge-like apparatus is lowered slowly toward the ocean floor three miles below.

Television cameras and lights allow the ship's crew to view the seabed path ahead of the dredgehead. Mining operations proceed with the ship moving forward at speeds of one-half to two miles an hour sucking up nodules at rates approaching 1,000 tons a day. There are also other mining methods being tested including a

series of circulating scoops to collect the nodules. A full-scale operation could gather about 5,000 tons a day.

In a mining operation (as opposed to just a gathering one) the nodules would then be transferred to an accompanying ore ship, which would rotate back to a shore base. However, the technology and economics of processing the nodules remains to be worked out. Nodules are composed of very complex ores. The metals have to be separated in a reasonably pure form by wet chemical process or by heat or by both.

Still looming on the horizon, and among the important keys to the future of ocean mining, are international legal aspects. The daring technological challenge to conquering this deepsea frontier could be delayed by the drawn-out international Law of the Sea Conference taking place under the aegis of the United Nations. The UN Law of the Sea Conference has been attempting to establish a new international regime to "manage" the seabed.

These negotiations have been continuing for more than ten years without significant progress in United Nations Committee I (Seabed Committee), and each session resulted in an impasse between the developed and developing nations. Even though the United States offered very generous concessions to resolve differences in 1976, the demands of the Group of 77 nations (developing nations caucus) have not diminished.

At the risk of oversimplifying a very complex set of negotiations, the impasse in Committee I appears to surround differing perceptions of the concept that the resources of the deep seabed are the "common heritage of mankind." The "have not" nations believe that the "have" nations should assist them in exploiting the deep seabed and distributing the wealth from such ventures to the developing world. While the United States government may be in general agreement with the common heritage principle, it is exceedingly difficult to implement such a concept while still maintaining the economic viability of an ocean mining venture.

The main point which the United States must make in any negotiations is that there will never be a sharing of the deepsea resources unless the terms of a final treaty are such as to attract the necessary investment and technology. Since the technology is in the hands of U.S. industry which is also capable of investing large sums of capital into such a venture, it is essential for the United States government to formulate an agreement which produces a positive investment climate. As in all the ocean industries, stability and understanding are needed.

On the domestic political front legislation has been introduced to encourage just such an investment climate. Most proposals carry provisions to establish an orderly domestic licensing procedure, to protect the marine environment adequately, and to require a national priority for access to processed minerals.

However, one of the most important sections addresses the problem of security of tenure for domestic miners. Simply stated, this provision would create a stable investment climate by ensuring that any future treaty

would allow U.S. miners to continue their deepsea operations under equitable terms and conditions.

Problems in investment, technological, and political agreements are just a few of the hurdles members of NOIA are facing in developing the promise of deepsea mining. The promise of deepsea mining is a promise the ocean industries are prepared to keep for America.

COASTAL ZONE MANAGEMENT QUESTIONS & ANSWERS

Many coastal citizens are aware of coastal zone management, but there are still many mistaken beliefs. Robert Knecht, Assistant Administrator of the Office of Coastal Zone Management recently said: "I know that, in the past, some coastal residents haven't fully understood the Coastal Zone Management Act, its provisions for citizen input, or the positive role the ocean industries play in a balanced overall CZM effort. I think it is important for all coastal users and citizens to share their concerns and develop a continuing dialogue. It is through effective communication that important bridges in understanding are built."

Knecht was talking about the dialogue that has been continuing for the past few years among concerned citizen groups in coastal states. People are getting together, sharing concerns, and talking with members of the National Ocean Industries Association about offshore development and effective coastal zone management. They want to know more about these matters, how they will be affected, and how they can participate in the decisions that affect them.

So that concerned citizens can learn of the benefits of coastal zone management and the contributions of the ocean industries, NOIA has collected some of the types of questions most frequently asked of NOIA members in formal and informal meetings with people all over the nation. We present them here, together with our responses. As a concerned citizen, you may find them useful in helping you to answer questions about coastal zone management. They may even answer some questions of your own.

Q. "I know what the Coastal Zone Management Act says it is supposed to do about providing for the wise use of coastal resources. But what I don't understand is that everybody who wants to use the beach believes that their group is the one the Act is meant to protect. What *is* the coastal resource that comes under the provisions of the Act?"

A. There has been a lot of confusion, partly because the Coastal Zone Management Act raises many difficult questions that for too long have been conveniently swept under the rug. The Act was not intended, nor is it now administered, either to exclude any responsible coastal use or to promote any single coastal activity. Part of the problem is the fact that the CZM Act is one of the few federal actions with a comprehensive sweep of responsibilites rather than a single purpose. For example, the government has set up specific clean air, clean water and solid waste disposal programs which mandate federal standards. Single issue programs such as these make it easier to charge ahead and cut compromises based on what one views as the single mission. The CZM Act seeks to balance many coastal activities, and in addition seeks a partnership with states, local governments and various interest groups to determine their needs and wants, rather than dictating from Washington. In a sense, then, it is a very "democratic" Act, and misconceptions are bound to occur because of individual perception and interpretation.

Q. "My friends tell me that the Act is just to protect swimmers and sport fishermen. Are they right?"

A. They are mistaken. The Act does provide that a variety of recreational activities on our nation's shore will continue, but it seeks much more. National defense, shipping, offshore energy development, and other ocean-related industries are certainly no less vital coastal activities than tourism and recreation. Unfortunately, some local and state planners have been taking a limited, provincial view, looking at their coastal areas as "private" bathing beaches, rather than with the total, balanced perspective called for by the CZM Act. The Act seeks cooperation and coordination between governments and users, and stipulates a proper balance between national needs and state and local concerns, allowing for *all* activities that can be conducted in harmony with state CZM plans.

Q. "Coastal areas are already too crowded. Why doesn't the Act prohibit some activities?"

A. Pressure *is* building up in the coastal areas of the U.S. As a recent CZM report to the President stated, "Burgeoning population

and increasing economic activity, crammed into a confined space, mean more conflicts." The coastal zone is a pressure cooker precisely because its bounds are limited. Yet because it is the place where land and water meet, it is more complex environmentally and economically, and often more important than interior areas. To reduce or defuse this pressure by arbitrarily halting some activities might seem, in theory, like a good idea. But, realistically speaking, which groups of citizens should be disenfranchised? What makes one activity more right than any other? The tough, fundamental problem of cooperative use of the coastal zone can be solved. That's the task the Coastal Zone Management Program has been charged with—to assist the states in accommodating important economic needs of coastal states and communities while improving the quality of life everyone seeks.

Q. "How does the OCZM hope to accomodate all coastal users when many activities, such as recreation and energy production, seem too diverse and are sure to increase—and eventually, conflict?"

A. That's a good question. The OCZM will not be able to do it alone. In fact, the lion's share of this task falls to the coastal states and their citizens. The Federal government, as represented by the OCZM, provides money to assist the states to determine their own coastal priorities, so long as those priorities are not inconsistent and do provide adequate recognition of the national interest. In writing the Act, Congress made a key assumption that coastal problems are due as much to a lack of coordination among users and local direction as they are to inherent coastal conflict. The Act assists the states in preparing for and understanding all users. There are potential conflicts between energy production and recreation, but not necessarily more so than between recreation and other coastal users, or other users among themselves. The wisdom of the Act is that it provides processes to help resolve these conflicts, and insists that an equitable resolution be found.

Q. "My wife and I live in the Middle West and we like to visit the shore for a vacation—I like surf fishing and she enjoys sunbathing and taking the grandkids swimming. So we're interested in the beach, but we don't see what all these other coastal activities have to do with us."

A. Everybody thinks of fishing and relaxing on the beach when the subject of the coastal areas comes up. But there's a lot more to it than sand, surf, and sun. Long before increased free time made beaches popular with vacationers, coastal areas were being used for commercial activities. In fact, if American industry had abused the privilege of using the coastal areas over the past 350 years, as much as some people would have others believe, our beaches, bays, and inlets might not be as desirable for recreation as they are. And every American benefits in some way from the ocean industries. The Great Plains farmer, the Northern manufacturer, the Southern textile producer, the California exporter all rely on commercial shipping to take their products to foreign markets and bring back things they need. This benefits us all as consumers. Nobody today has to be reminded about our dependence on expensive foreign oil—but think what it would be like if more than 30 years of offshore energy production wasn't providing us with nearly a quarter of our domestic production of oil and gas. And the percentage will very likely go up considerably because of declining onshore reserves. National defense is another coastal zone activity that has benefits for all of us—of 432 principal military installations or activities in the United States, 330 (76 percent) are in coastal states.[25] We must not forget commercial fishermen, either, who bring in the shrimp, lobster, oysters, and sea bass that

diners enjoy in Topeka, Tucson, and Tulsa. It's important to reiterate that the CZM Act recognizes both the environmental and economic resources of coastal areas and seeks a balanced approach in managing these valuable resources.

Q. "What is the National Ocean Industries Association?"

A. The National Ocean Industries Association is the only trade association representing all forms of ocean development. Many ocean firms are represented in NOIA such as companies specializing in geophysical surveying, construction, diving, fishing, deepsea mining, marine salvage, air and marine transportation, financial services, offshore drilling, catering and housekeeping, petroleum production, research and technology, equipment manufacture and supply, and others. There are petroleum companies in the NOIA membership (less than 5 percent) but no industry group dictates to the others. Many NOIA members are part of the "oil industry" although not oil companies. Petroleum companies hire the services needed to explore and develop leases offshore. They contract for most of their offshore exploration requirements. They become known as lease operators and hire a drilling contractor to explore and produce an offshore tract they lease from the government. The drilling contractor buys the chains and engines and many parts he needs from suppliers, like steel, engine, and manufacturing companies, throughout the United States. The lease operator hires boats to transport equipment and helicopters to transport men to the rig. An independent catering firm prepares the food. In fact, the drilling contractor even buys his rigs from a shipyard which itself needs equipment and services. And then there are, of course, geophysical contractors, marine engineers, technology firms, and others all doing their part to ensure offshore success and safety. It's a big task with many components and it all means benefits to Americans in the form of hundreds of thousands of direct and related jobs, lower prices for consumers, a more stable economy and decreased foreign monetary transfers, more tax revenues, and more energy. All these activities are represented in the NOIA membership and are conducted with minimal danger to coastal areas.

Q. "I just don't believe that there isn't environmental damage from offshore development."

A. Any coastal use causes some environmental alteration. Walking on the beach probably hastens erosion, but that doesn't mean we should rope off the beaches to everyone who isn't a picture postcard photographer.

As far as offshore oil and gas are concerned, during the last 30 years more than 23,000 wells have been drilled on less than four percent of our Outer Continental Shelf with no serious adverse ecosystem changes. There has been only one accident which can be described as serious, and it did not permanently damage the environment. This is not to say that offshore pollution from drilling and production activities doesn't exist. Much more serious, however, are the trash barges that dump thousands of tons of garbage and sewage sludge from Northeastern cities into the ocean every day. The oceans have amazing powers of rejuvenation, but the sludge dumping area in the Atlantic, a huge, brownish black spot covering miles, is a desert, a dead sea where nothing lives. Fortunately, efforts are being made to get rid of our waste in more responsible ways, and we can look forward to the day when all our lakes, rivers, and seas will no longer be despoiled by improper usage.

Q. "Are you trying to claim that offshore petroleum development doesn't cause any pollution to our ocean environment?"

A. It is doubtful that a statement as definite as that on any subject would be true. But let's put things into perspective. In 1976, a study[26]

by the United States Geological Survey documented oil spills in the Gulf of Mexico from 1971 to 1975. The study determined that the spillage rate was .00028 percent per barrel of oil landed. A 1975 Library of Congress Study [27] said that there is no appreciable pollution from domestic petroleum development. And in March of 1976, an Office of Technology Assessment Report [28] prepared for the House Ad Hoc Committee on the Outer Continental Shelf, stated that spills were ten times as likely to occur in vessels importing foreign oil (as in the ARGO MERCHANT incident) than from domestic offshore petroleum operations. It is ironic that if we had more domestic OCS production there would be less need to import expensive foreign petroleum products, which are ten times as likely to pollute our coastal areas. The study went on to document the causes of ocean pollution, and while it's rarely beneficial to point fingers, it is interesting to note that more pollution comes from municipal waste and individual runoff (i.e. drained crank-case oil finding its way into waterways and eventually the oceans) than from domestic offshore energy efforts.

Q. "I'm willing to accept the fact that we need offshore oil and gas production, but I sure don't like the idea of visiting my favorite beach and seeing a bunch of drilling rigs and production platforms sticking up like sore thumbs."

A. Of all the North and Mid Atlantic OCS tracts leased through 1978, none are closer than 90 miles from the coast. You couldn't see them even with the world's most powerful telescope, because of the curvature of the earth, which limits direct line vision (depending on the height of a structure) to 21 miles or so. Furthermore, no OCS leasing in the Atlantic is planned for areas closer than 21 miles from the coast. In California, where some operations are close to land, platforms are often made to be non-obtrusive. On the other hand, there are many people who consider modern drilling rigs and platforms as spectacular creations. Some great photographs have been taken far out in the Gulf of Mexico showing nothing but water, a fishing boat, a rig or platform and the sunset.

Q. "What can I do to help get the Coastal Zone Management process rolling in my area?"

A. Glad you're getting involved! The success of the CZM Act depends on the involvement of knowledgeable, concerned citizens. While local, state, and federal officials do their best to act upon the needs and preferences of their consititutents, they often have difficulty recognizing these needs until people speak out. There are ways to do this. Under the Act, states have already designated a single agency for state programs on coastal matters. They all have different names however, such as Office of Planning and Budget (Georgia); Department of Ecology (Washington); Coastal Management Unit (New York); Office of Coastal Zone Management (New Jersey); California Coastal Commission (California); et cetera. Write your state's CZM office to become informed about your state's program and express your feelings on what should be accomplished. Contact your elected officials, take part in public hearings, and make yourself heard. Finally, follow the progress and inform your friends and neighbors to make sure your state's plan is fairly and prudently administered.

Activity is already underway in all coastal states, but there is still much you can do to shape the program or make sure it is being properly administered to make wise use of coastal resources. Citizen input, together with that of local governments and user groups, is needed to fashion each state's decisions on how to deal with key coastal problems and issues. The Federal

responsibility is to make sure that the state has fully considered a range of present and potential needs of coastal areas, and has developed procedures—based on knowledge, public participation, responsible government policies, and user practices—for wise decision-making.

Q. "All this sounds pretty good, but before I do anything I want to check on some of the things you've told me. Where can I get more information on coastal issues?"

A. It is good to search for more information from other interest and user groups. The Office of Coastal Zone Management can provide this information, and NOIA welcomes your further inquiries into any aspect of our report. In general, every group recognizes the needs of all coastal users, but with specific differences of balance and knowledge. Each group has its own perspective as well as its own expertise. The members of the National Ocean Industries Association have been in the offshore business since its inception, and we plan to be involved in the daily challenge of supplying America's needs from our offshore areas for a long, long time to come.

WANT TO KNOW MORE?

The National Ocean Industries Association will be glad to send you more information or answer your specific questions. We believe not only in sharing information, but in listening to other concerns, too.

National Ocean Industries Association
1100 Seventeenth Street, N.W., Suite 410
Washington, D.C. 20036

For the names of other user groups who offer a different perspective, and for information on the Act and its progress, contact:

Office of Coastal Zone Management
National Oceanic and Atmospheric Administration
Page One Building
3300 Whitehaven Street
Washington, D.C. 20235

For further information on specific state efforts and how you can participate, contact your state office. The Office of Coastal Zone Management can put you in touch with CZM officials in your state.

FOOTNOTES AND PHOTO CREDITS

1. Coastal Zone Management Act of 1972, Public Law 92-583, § 303(a)(b), 86 STAT. 1281.
2. Coastal Zone Management Act Amendments of 1976, Public Law 94-370, § 308, 16 USC 1457-64.
3. Coastal Zone Management Act of 1972, Public Law 92-583, § 302(b), 86 STAT. 1280.
4. Coastal Zone Management Act of 1972, Public Law 92-583, 86 STAT. 1280.
5. Coastal Zone Management Act of 1972, Public Law 92-583, § 306 2(c) (8), 86 STAT. 1284, (1972).
6. Coastal Zone Management Act Amendments of 1976, Public Law 94-370, § 307(b), 16 USC 1456.
7. Section 305 of the Coastal Zone Management Act specifies each approved state management program shall include: (1) an identification of the boundaries of the coastal zone subject to the management program; (2) a definition of what shall constitute permissible land and water uses within the coastal zone having a direct and significant impact; (3) an inventory and designation of particular areas of concern within the coastal zone; (4) an identification of the means by which the state proposes to exert control over its coastal zone, (including a listing of relevant constitutional provisions, state legislative enactments, regulations, and judicial decisions); (5) broad guidelines on priority uses in particular areas of the coastal zone; and (6) a description of the state's CZM structure. Coastal Zone Management Act, Public Law 92-583, § 305(b), 86 STAT. 1282, (1972). Also see Section 306 program approval regulations.
8. The thirteen states which had approved and funded coastal zone management programs as of September 30, 1978 were: Washington, Oregon, California, Wisconsin, Michigan, Maine, Massachusetts, Rhode Island, New Jersey, Maryland, North Carolina, Puerto Rico, and Hawaii.
9. The Office of Coastal Zone Management expects the following additional states to have approved coastal zone management plans by September 30, 1979: Virgin Islands, Alabama, Delaware, Guam, Louisiana, Alaska, Florida, Texas, and South Carolina.
10. Section 312 Reviews are so-named because of the section of the Act which authorizes them. Coastal Zone Management Act Amendments of 1976, Public Law 94-370, § 312, 16 USC 1456c.
11. "Oil and gas seeps are known to occur throughout the world and have been catalogued and documented by many observers; however, nearly all of the seeps noted were found on land, whereas relatively few references to underwater seeps appear in the literature.

    The presence of onshore seeps in California, particularly in Southern California, is not uncommon. Archeologists have established the fact that prehistoric Indians used tar from seeps to waterproof baskets and caulk canoes at least 7,000 years ago." Elbert R. Wilkinson, "California Offshore Oil and Gas Seeps," *California Summary of Operations*, 57th Annual Report of the State Oil and Gas Supervisor, Resources Agency of California, Department of Conservation, Division of Oil and Gas, Volume 57, No. 1, 1971.
12. A. A. Allen and R. S. Schulter, "Estimates of Surface Pollution Submarine Seeps at Platform A and Coal Oil Point," General Research Corporation memorandum No. 1230, 1969, as found in *California Summary of Operations*, 57th Annual Report of the State Oil and Gas Supervisor, Resources Agency of California, Department of Conservation, Division of Oil and Gas, Volume 57, No. 1, 1971.
13. "Naturally Occuring Hydrocarbon Seeps in the Gulf of Mexico and the Caribbean Sea," Department of Oceanography, College of Geosciences, Texas A&M University, May, 1979. A copy of the report may be obtained from: Dr. Richard A. Geyer, Professor of Oceanography, Department of Oceanography, Ocean Hydrocarbon Research Study, Texas A&M University, College Station, Texas 77843.
14. "Offshore Ecology Investigation," Gulf Universities Research Consortium, Report No. 138, September 20, 1974. Researched and written by The Program Planning Council: Dr. Robert Menzies, Dr. James Morgan, Dr. Carl Oppenheimer, and Dr. Sayed El-Sayed. The report data is periodically being reexamined and updated by three principal investigators: Dr. Michael Bender, Virginia Institute of Marine Science; Dr. Donald Reish, University of California at Long Beach; and Dr. C. H. Ward, Rice University; and "Effects of Man's Activities on the Marine Environment," a study prepared for the 94th Congress at the request of Senator Warren G. Magnuson, Chairman, Committee on Commerce and Senator Ernest F. Hollings, Chairman, National Ocean Policy Study, U.S. Government Printing Office, 45-670, Washington, D.C., 1975.
15. Preliminary Estimates, U.S. Bureau of Mines, Division of Conservation, U.S.G.S., OCS Statistics, 1978.
16. Source: First City National Bank as quoted in the American Petroleum Industry Fact Book, Section V, Table 4, (June 1977).
17. A brief look into the government's OCS leasing procedures is available in a Department of the Interior booklet, "Leasing and Management of Energy Resources on the Outer Continental Shelf," (USGS Inf.-74-33), U.S. Government Printing Office 1976-211-345/18, from the U.S. Department of the Interior, Office of Public Affairs, 18th and C Streets, N.W., Washington, D.C. 20240.
18. "OCS Orders 1 thru 14 Governing Oil, Gas, and Sulphur Leases in the Outer Continental Shelf Gulf of Mexico Area," U.S. Department of the Interior, Geological Survey, Conservation Division, Order No. 8 § 4(A) p. 8–5, January, 1977.
19. "OCS Orders 1 thru 14 Governing Oil, Gas, and Sulphur Leases in the Outer Continental Shelf Gulf of Mexico Area," U.S. Department of the Interior, Geological Survey, Conservation Division, Order No. 8 § 6 p. 8–21, January, 1977.
20. "Effects of Offshore Oil and Natural Gas Development on the Coastal Zone," a study by the Library of Congress Congressional Research Service. The study was prepared for the Ad Hoc Committee on the Outer Continental Shelf (House of Representatives, March, 1976), U.S. Government Printing Office 69-969-0.
21. USGS Circular 741 (1976).
22. Published market forecast by National Supply Company, Houston, Texas.
23. Figures from the "Employment and Earnings Publication," U.S. Department of Labor, Bureau of Labor Statistics, Standard Industrial Classification (SIC), 3533.
24. Year end statement of Edwin M. Hood, President, Shipbuilders Council of America, December 27, 1978. The Shipbuilders Council of America is a national trade association composed of the Nation's major commercial shipyards and suppliers of marine equipment and materials.
25. "United States Military Installations or Activities in the Fifty States," Department of the Army pamphlet, 210 1, April, 1977, revised, December 1977, 18 pp. Note these figures are subject to change as major activities are redefined. These figures include the Great Lakes States as coastal states and all bases in a coastal state whether or not the installations themselves are in coastal areas.
26. USGS Circular 741 (1976).
27. "Effects of Man's Activities on the Marine Environment," Congressional Research Service.
28. IBID footnote 20.

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